

November 9, 1995

Mr. Scott Lattimore Douglas Aircraft Company 3855 Lakewood Boulevard, M/C 9-20 Long Beach, California 90846

SUBJECT: REPORT OF SOIL INVESTIGATION AND REMOVAL

MCDONNELL DOUGLAS CORPORATION

DOUGLAS AIRCRAFT COMPANY BUILDING NO. 61

TORRANCE, CALIFORNIA ESE PROJECT NO. 6495203

Dear Mr. Lattimore:

This report documents soil investigation and removal performed in July, August and September 1995 at Building No. 61 of the Douglas Aircraft Company (DAC) facility in Torrance, California. The work was performed by Environmental Science & Engineering, Inc. (ESE) for DAC. The objectives were to (1) determine the remaining concentrations of polychlorinated biphenyls (PCBs) in soil beneath the former location of an electrical transformer adjacent to Building No. 61, and (2) remove all soil containing PCB concentrations above the federal cleanup level of 10 milligrams per kilogram (mg/kg) stated in 40 CFR Part 761. Site background, data collection procedures, methods used for laboratory analysis, and chemical findings are discussed in the following sections.

#### **BACKGROUND**

The DAC Torrance facility is located south of 190th Street between Western and Normandie Avenues in Torrance, California (Figure 1). The DAC facility is approximately 700 feet south of the San Diego Freeway and 0.9 mile west of the Harbor Freeway. Building No. 61 is in the northern portion of the facility (Figure 2).

While dismantling an electrical transformer at the site in May 1995, PCBs were accidently spilled onto the concrete pad. IT Corporation recovered most of the PCB dielectric fluid immediately following the spill; however, approximately 60 gallons of the fluid migrated through cracks and seams in the concrete and surrounding asphalt. It was discovered that some of the fluid had drained through a manhole and into an underground electrical vault. That fluid is believed to have reached the underlying soil through a drain at the bottom of the vault. The vault and surrounding soil containing PCBs were subsequently removed by IT Corporation.

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#### **SOIL INVESTIGATION**

DAC retained ESE to verify that all soil containing PCB concentrations above the federal cleanup level of 10 mg/kg) had been removed. To meet that objective, ESE collected soil samples in a grid pattern to perform statistical sampling. The soil investigation is described below.

#### **METHODOLOGY**

ESE used U.S. Environmental Protection Agency (USEPA) guidance documents to determine the most effective plan for statistical sampling. The major advantage of statistical sampling is that the residual PCB concentrations within the entire sampling area can be characterized with a high degree of confidence using fewer samples than required for other methodologies. Statistical sampling also allows for sites to be characterized using composite samples.

A 37-point sampling grid was used to determine if the site had been remediated to the established cleanup level. The grid spacing was determined using USEPA protocol (Kelso, Erickson and Cox, 1986). Composite analysis was initially used to ensure 99.5 percent confidence in the analytical results (Boomer, Cox and Erickson, et al., 1985). Individual analysis was performed when (1) a sample exhibited field indications of PCBs, and/or (2) the composite sample did not meet the confidence criteria outlined by Boomer, Cox and Erickson, et al. These methodologies are described in Appendix A.

The soil samples were collected using a slide-hammer sampling device. When necessary a hand auger and 5-foot extensions were used to drill to the desired sampling depth. Each sample was labeled, logged onto a chain-of-custody document, and then placed in an ice chest for cold storage during field work and transport to the laboratory. These procedures are in accordance with guidelines and practices established by federal, state and local agencies. Before the drilling/sampling equipment was used at each location, it was cleaned to avoid potential cross-contamination of the samples. The equipment was washed with an approved cleaning solution, rinsed with water, rinsed again with water and then air dried.

The soil samples were submitted, under proper chain-of-custody procedures, to a state-certified laboratory for analysis. The samples were analyzed for PCBs using USEPA Method 8080. The analyses included detection of aroclors-1016, -1221, -1232, -1242, -1248, -1254, and -1260.

# INITIAL GRID SAMPLING AND ANALYTICAL RESULTS

On July 18, 1995, ESE personnel collected soil samples from the vault excavation floor using the 37-point grid pattern. Samples were also collected from the excavation sidewalls. The sampling locations are shown on Figure 3. Analytical results for the soil samples are shown in Table 1. Copies of the laboratory reports and chain-of-custody documents are in Appendix B.

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Detectable PCB concentrations in three composite samples were above the established cleanup level: D1 through D10, D11 through D20, and D25-1 through D31-15. Therefore, the samples were analyzed individually and PCB concentrations were found to be above the cleanup level in Samples D4, D18, D19, D25-1, D27-1 and D27-5. Aroclor-1260 was the only PCB identified.

#### **EXCAVATION OF SOIL CONTAINING PCBs**

On August 24, 1995, Jerry's Backhoe Service of Paramount, California, under the supervision of ESE personnel, excavated approximately 15 yards of soil containing PCBs. This soil was placed into roll-off bins and the disposal was coordinated by IT Corporation. Upon removal of the affected soil, ESE collected Samples MD-1 through MD-6 to verify that PCB concentrations in the remaining soil were below the cleanup level (Figure 3). The samples were analyzed using USEPA Method 8080. The analytical results are shown in Table 2. Copies of the laboratory report and chain-of-custody document are in Appendix B. PCBs were not detected in the verification samples.

#### SUBSEQUENT GRID SAMPLING AND ANALYTICAL RESULTS

On September 6, 1995, ESE personnel performed additional grid sampling at the request of DAC. The sampling locations are shown on Figure 4. The analytical results are shown in Table 3. Copies of the laboratory reports and chain-of-custody documents are in Appendix C. The results show that soil remaining in the investigated area does not contain PCB concentrations above the 10 mg/kg cleanup goal.

#### REFERENCES

- Boomer, B., Cox, D., Erickson, M., Kelso, G., Schultz, B., and Swanson, S., 1985, Verification of PCB Spill Cleanup by Sampling and Analysis: Interim Report No. 2, Work Assignment No. 37: Prepared for USEPA, Office of Toxic Substances, Exposure Evaluation Division, USEPA Contract Nos. 68-02-3938 and 68-01-6721, August 1985.
- Kelso, G., Erickson, M., and Cox, D., 1986, Field Manual for Grid Sampling of PCB Spill Sites to Verify Cleanup: Interim Report No. 3, Work Assignment 37: Prepared for USEPA, Office of Toxic Substances, Field Studies Branch, USEPA Contract Nos. 68-02-3938 and 68-01-6721, May 1986.
- U.S. Government Printing Office (USGPO), 1990, Code of Federal Regulations, Title 40, Part 761: USGPO, Washington, D.C.

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Our professional services have been performed using that degree of care and skill ordinarily exercised under similar circumstances by other geologists and engineers practicing in this field. No other warranty, express or implied, is made as to the professional advice in this report.

If you have any comments or questions regarding the contents of this report, please call David Ferreira at (714) 964-8722.

Sincerely, ENVIRONMENTAL SCIENCE & ENGINEERING, INC.

David A. Ferreira

Senior Project Hydrogeologist

Elizabeth A. Robbins, R.G.

Wigabeth a. notor

Chief Geologist

California Registered Geologist No. 4874

**Attachments** 

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**TABLES** 

TABLE 1. ANALYTICAL RESULTS FOR INITIAL GRID SOIL SAMPLING ON JULY 18, 1995

SAMPLE ID	EPA METHOD 8080	SAMPLE ID	EPA METHOD 8080
	PCB (mg/kg)		PCB (mg/kg)
Comp D1-D10	31.0	Comp D21-D24,D28, D29,D30,D33,D34,D40	1.7
D1	ND	Comp D25-1,D25-8,D25- 13,D26-2,D26-7,D26- 13,D31-5,D31-10,D31-15	3.7
D2	0.17	D25-1	16.0
D3	ND	D25-8	2.2
D4	90	D25-13	0.13
D5	0.34	D26-2	2.9
D6	0.095	D26-7	0.68
D7	ND	D26-13	ND
D8	ND	D27-1	3,500
D9	ND	D27-5	220
D10	0.15	D31-5	4.4
Comp D11-D20	4.7	D31-10	ND
D11	0.66	D31-15	0.56
D12	2.20	D32-1	ND
D13	ND	D32-6	ND
D14	ND	D32-11	3.1
D15	4.70	D37-1	8.3
D16	9.90	D37-6	0.18
D17	1.40	D37-12	0.11
D18	10.0	Comp D35-1,D35-13, D36-1,D36-7,D36-13, D38-1,D38-5,D38-11	ND
D19	35.0		
D20	ND		

#### NOTES:

EPA - U.S. Environmental Protection Agency

mg/kg - milligrams per kilogram or parts per million

PCB - polychlorinated biphenyl (aroclor-1260)

Comp - composite sample

TABLE 2. ANALYTICAL RESULTS FOR SOIL SAMPLES COLLECTED FOLLOWING ADDITIONAL EXCAVATION ON AUGUST 24, 1995

SAMPLE ID	EPA METHOD 8080 PCB (mg/kg)
MD-1	ND
MD-2	ND
MD-3	ND
MD-4	ND
MD-5	ND
MD-6	ND

NOTES: See below

TABLE 3. ANALYTICAL RESULTS FOR SUBSEQUENT GRID SOIL SAMPLING ON SEPTEMBER 6, 1995

SAMPLE ID	EPA METHOD 8080
	PCB (mg/kg)
19	4.1
20	ND
Comp 1-10	0.12
Comp 11-18	1.7
Comp 21-33	0.68
Comp 34-1,34-6,34-12½,35-1,35-5, 35-13½,36-1,36-6,36-12,37	0.4
Comp 26-1,26-5,26-11,27-13, 28-11,29-1,29-6½,29-12	ND

#### NOTES:

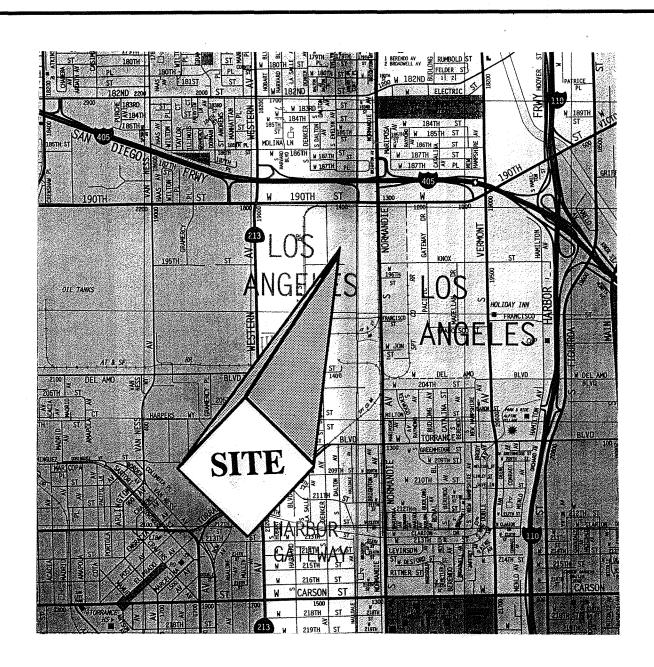
EPA - U.S. Environmental Protection Agency

mg/kg - milligrams per kilogram or parts per million

PCB - polychlorinated biphenyl (aroclor-1260)

Comp - composite sample

**FIGURES** 

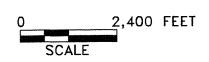


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Section: H-3





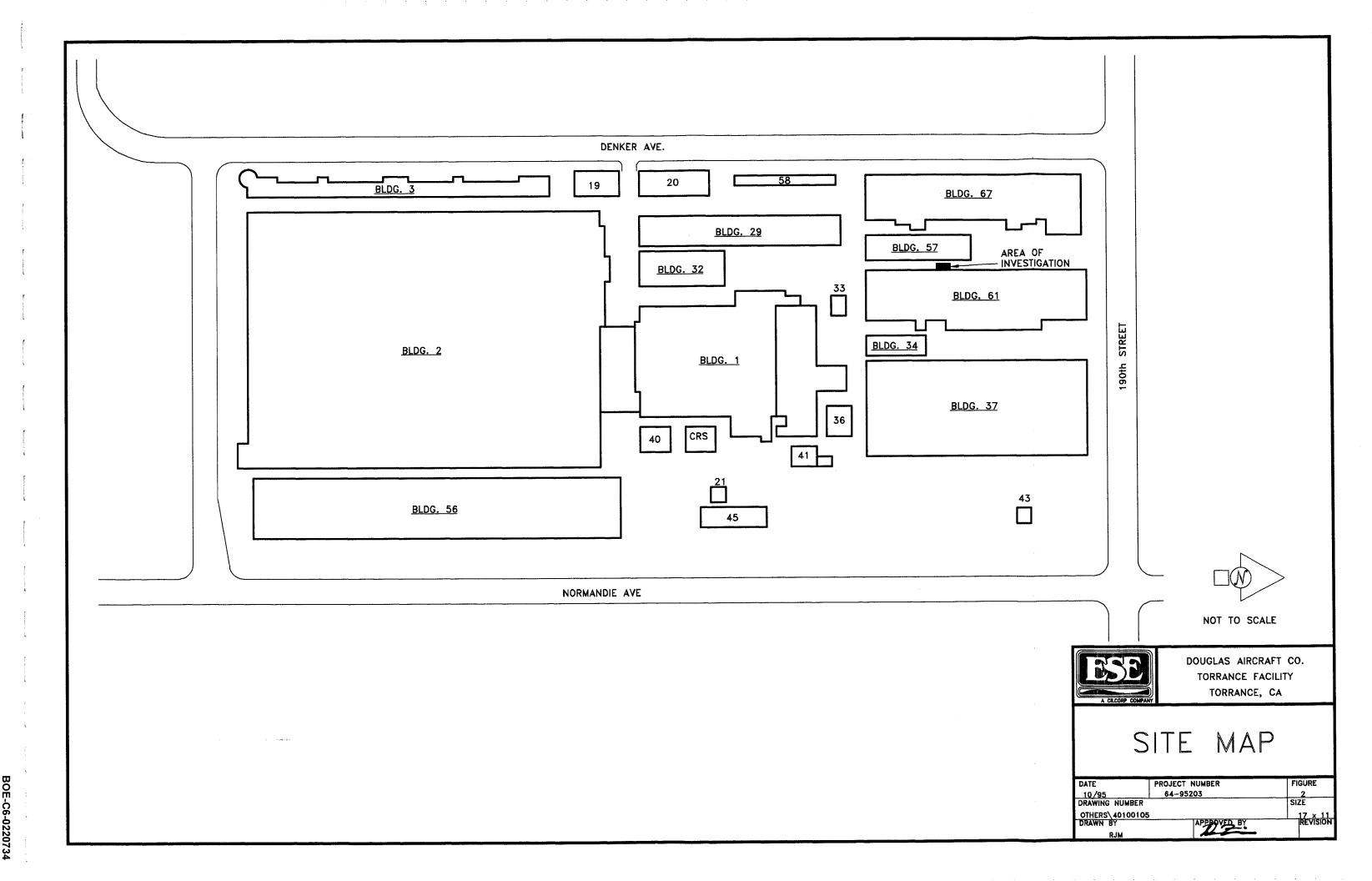
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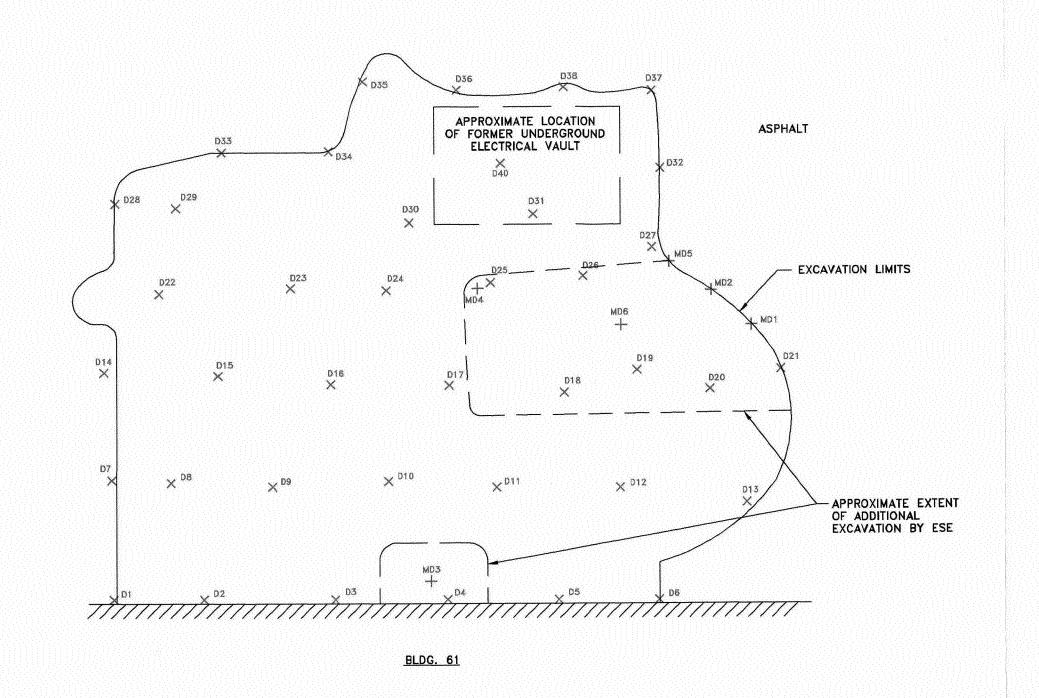


DOUGLAS AIRCRAFT CO. TORRANCE FACILITY TORRANCE, CA.

# LOCATION MAP

		·
DATE	PROJECT NUMBER	FIGURE
11/95	64-95203	1
DRAWING NUMB	ER	SIZE
G:\DWGS\CHAR	TS\SITE1	8.5 x 11
DRAWN BY	APPROVED BY	REVISION
RJM		

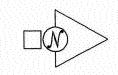




# **EXPLANATION**

- × INITIAL GRID SAMPLING LOCATION (7/18/95)
- + SAMPLING LOCATION FOLLOWING ADDITIONAL EXCAVATION (8/24/95)





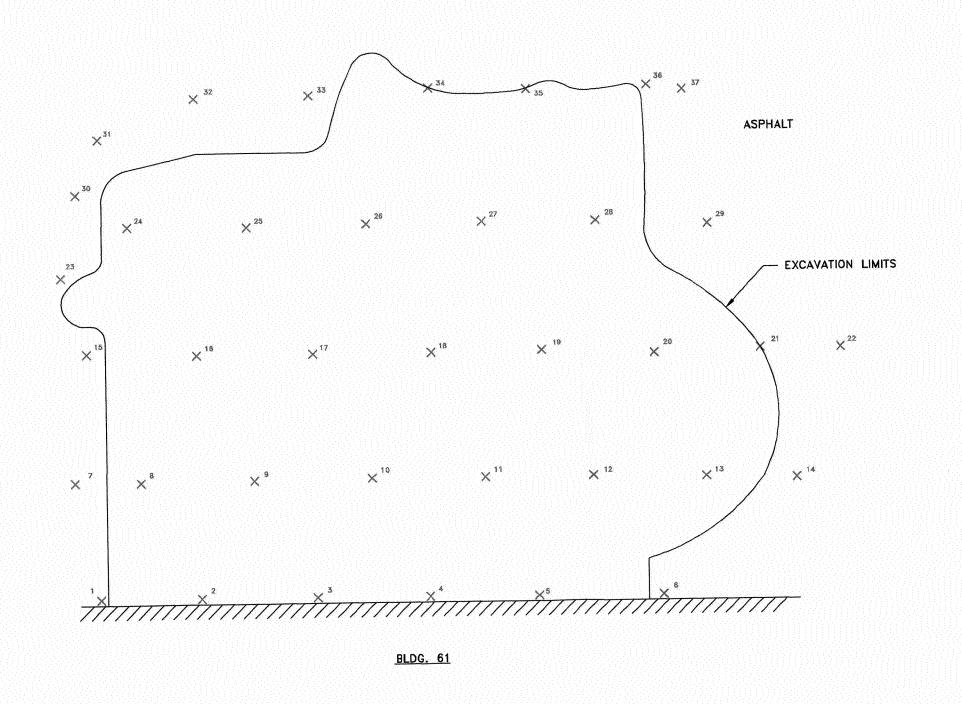


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TORRANCE FACILITY
TORRANCE, CA

# INITIAL GRID SAMPLING LOCATION MAP

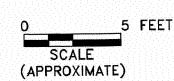
DATE	PROJECT NUMBER	FIGURE
10/95	64-95203	3
DRAWING NUMBER		SIZE
OTHERS\4010010		17 x 1
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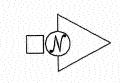
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# **EXPLANATION**

× SUBSEQUENT GRID SAMPLING LOCATION (9/6/95)







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TORRANCE, CA

# SUBSEQUENT GRID SAMPLING LOCATION MAP

DATE	PROJECT NUMBER	FIGURE
10/95	64-95203	4
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# APPENDIX A SAMPLING AND COMPOSITING METHODOLOGIES

#### **DETERMINATION OF SAMPLING SCHEMES**

Sampling Area (ft²)	Radius (ft)	Sample Size	Radius of smallest circle to be sampled (ft)
50	4.0	7	2.0
150	6.9	19	1.9
400	11.3	19	3.2
875	16.7	37	3.2

# COMPOSITING STRATEGY FOR ANALYSIS OF SAMPLES

To protect against false positive findings due to analytical error, the measured PCB level in a single sample must exceed some cutoff greater than 10 mg/kg for a finding of contamination. Assume that a 0.5% false positive rate for a single sample is desired. This single sample false positive rate controls the overall false positive rate of the sampling schemes to acceptance levels. Using standard statistical techniques with a method performance of 80% accuracy and 30% relative standard deviation, the cutoff level for a single sample is:

$$(0.8)(10) + (2.576)(0.3)(0.8)(10) = 14.2 \text{ mg/kg}$$

where 2.576 is a coefficient from the standard normal distribution. Thus, if the measured level in a single sample is 14.2 mg/kg or greater, one can be 99.5% sure that the true level is 10 mg/kg or greater.

If a composite of 7 samples is analyzed, the true PCB level in the composite is simply the average of the 7 individual samples. Therefore 14.2/7 = 2.0, and all 7 samples are considered clean if the composite samples have a concentration less than 2.0.

The following pages are the most applicable in determining sampling schemes. These pages were part of the document by Boomer, Cox and Erickson, et al., 1985.

#### IV. GUIDELINES ON SAMPLING AND ANALYSIS

Reliable analytical measurements of environmental samples are an essential ingredient of sound decisions for safeguarding public health and improving the quality of the environment. Effective enforcement monitoring should follow the general operational model for conducting analytical measurements of environmental samples, including: planning, quality assurance/quality control, verification and validation, precision and accuracy, sampling, measurements, documentation, and reporting. Although many options are available when analyzing environmental samples, differing degrees of reliability, dictated by the objectives, time, and resources available, influence the protocol chosen for enforcement monitoring. The following section outlines the factors critically influencing the outcome and reliability of enforcement monitoring of PCB spill cleanup.

#### A. Sampling Design

This section presents a sampling scheme, for use by EPA enforcement staff, for detecting residual PCB contamination above a limit designated by EPA-OPTS after the site has been cleaned up. Two types of error traceable to sampling and analysis are possible. The first is false positive, i.e., concluding that PCBs are present at levels above the allowable limit when, in fact, they are not. The false positive rate for the present situation should be low, because an enforcement finding of noncompliance must be legally defensible; that is, a violator must not be able to claim that the sampling results could easily have been obtained by chance alone. Moreover, all sampling designs used must be documented or referenced.

The second type of error possible is a <u>false negative</u>, i.e., failure to detect the presence of PCB levels above the allowable limit. The false negative rate will depend on the size of the contaminated area and on the level of contamination. For large areas contaminated at levels well above the allowable limit, the false negative rate must, of course, be low to ensure that the site is brought into compliance. The false negative rate can increase as the area or level of contamination decrease.

# Proposed Sampling Design

In practice, the contaminated area from a spill will be irregular in shape. In order to standardize sample design and layout in the field, and to protect against underestimation of the spill area by the cleanup crew, sampling within a circular area surrounding the contaminated area is proposed. Guidance on choosing the center and radius of the circle, as well as the number of sample points to be used is provided in Section 2 below.

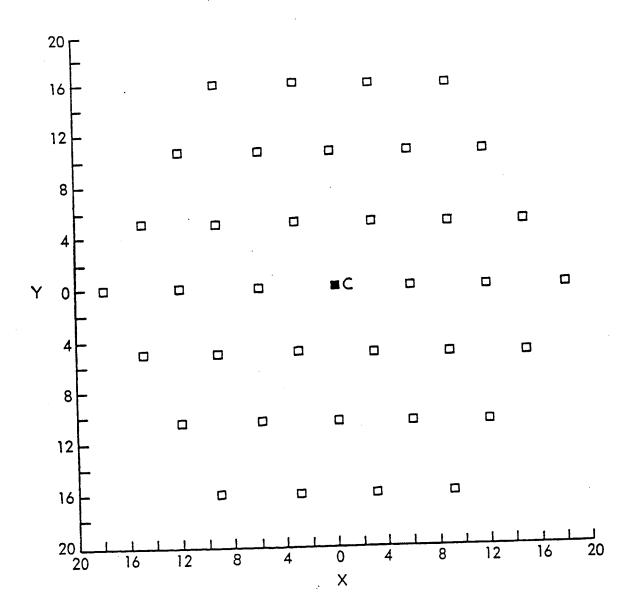
The detection problem was modeled as follows: try to detect a circular area of uniform residual contamination whose center is randomly placed within the sampling circle. Figure 1 illustrates the model. The figure depicts a sampling circle of 10 ft centered on a utility pole (site of the spill). After cleanup, a residually contaminated circle remains. However, in choosing locations at which to sample, the sampler has no knowledge of either the location of the circle or the level of contamination. This

lack of knowledge was modeled by treating the sampling locations as fixed and the center of the contaminated circle as a <u>randomly</u> located point in the circle of radius 10 ft. The implicit assumption that residual contamination is equally likely to be present anywhere within the sampling area is reasonable, at least as a first approximation (Lingle 1985). This is because more effort is likely to have been expended in cleaning up the areas which were obviously highly contaminated.

Two general types of design are possible for this detection problem: grid designs and random designs. Random designs have two disadvantages compared to grid designs for this application. First, random designs are more difficult to implement in the field, since the sampling crew must be trained to generate random locations onsite, and since the resulting pattern is irregular. Second, grid designs are more efficient for this type of problem than random designs. A grid design is certain to detect a sufficiently large contaminated area while some random designs are not. For example, the suggested design with a sample size of 19 has a 100% chance to detect a contaminated area of radius 2.8 ft within a sampling circle of radius 10 ft. By contrast, a design based on a simple random sample of 19 points has only a 79% chance of detecting such an area.

Therefore, a grid design is proposed. A hexagonal grid based on equilateral triangles has two advantages for this problem. First, such a grid minimizes the circular area certain to be detected (among all grids with the same number of points covering the same area). Second, some previous experience (Mason 1982; Matern 1960) suggests that the hexagonal grid performs well for certain soil sampling problems. The hexagonal grid may, at first sight, appear to be complicated to lay out in the field. Guidance is provided in Section 2 below and shows that the hexagonal grid is quite practical in the field and is not significantly more difficult to deploy than other types of grid.

The smallest hexagonal grid has 7 points, the next 19 points, the third 37 points as shown in Figures 2 through 4. In general, the grid has  $3n^2 + 3n + 1$  points. To completely specify a hexagonal grid, the distance between adjacent points, s, must be determined. The distance s was chosen to minimize, as far as possible, the size of the residual contaminated circle which is certain to be sampled. Values of s so chosen, together with number of sampling points and radius of smallest circle certain to be sampled are shown in Table 2. For example, the grid spacing for a circle of radius 20 ft for the 7-point design is s = (0.87)(20) = 17.4 ft. For a given size circle, the more points on the grid, the smaller the residual contamination area which can be detected with a given probability.



The outer boundary of the contaminated area is assumed to be 20 feet from the center (C) of the spill site.

Figure 4. Location of sampling points in a 37-point grid.

The first three hexagonal designs are shown in Figures 2 to 4, for a sampling circle radius of r=10 ft. The choice of sample size depends on the cost of analyzing each sample and the reliability of detection desired for various residually contaminated areas. Subsection 2 below provides some suggested sample sizes for different spill areas, based on the distribution of spill areas provided by the Utility Solid Waste Activities Group (USWAG 1984; Lingle 1985).

### 2. Sample Size and Design Layout in the Field

#### a. <u>Sample Size</u>

The distribution of cleanup areas for PCB capacitor spill sites, based on data collected by USWAG (1984; Lingle 1985) is shown in Table 3. The smallest spill recorded in the USWAG database is 5 ft $^2$ , the largest 1,700 ft $^2$ . The median cleanup area is 100 ft, the mean 249 ft $^2$ ; the wide discrepancy between the mean and the median reflects the presence of a small percentage of relatively large spills in the database.

Recommended sample sizes are given in Table 4. Several considerations were involved in arriving at these recommendations. First, the maximum number of samples recommended for the largest spills is 37, in recognition of practical constraints on the number of samples that can be taken. Even so, it is important to note that not all samples collected will need to be analyzed. The calculations in Section 5 below show that, even for the 37 sample case, no more than 8 analyses will usually be required to reach a decision. Since the cost of chemical analyses is a substantial component of sampling and analysis costs, even the 37-sample case should not, therefore, be prohibitively expensive. Second, the typical spill will require 19 samples. Small spills, with sampling radius no greater than 4 ft, will have 7 samples, while the largest spills, with sampling radius 11.3 ft and up, will require 37 samples. It should be noted that only capacitor spills are represented in Table 3. Transformer spills, however, would be expected to be generally smaller than capacitor spills because energetic releases are less likely from transformers. Thus, one would expect the <u>smaller</u> sample sizes to be relatively more likely for transformer spills than capacitor spills.

Table 3. Distribution of PCB Capacitor Spill Cleanup Areas Based on 80 Cases

Cleanup area (ft <sup>2</sup> )	Percent of cases
<pre> ≤ 50 51-100 101-200 201-300 301-400 401-700 701-1,300 ≥ 1,300</pre>	32.5 18.8 15.0 12.5 3.8 7.5 8.8 1.3

Source: Lingle 1985.

Table 4. Recommended Sample Sizes

Sampling area (ft <sup>2</sup> )	Radius of sampling circle (ft)	Percent of PCB capacitor spills	Sample size
≦ 50	≦ 4	32.5	7
51-400	4-11.3	50.0	19
> 400	> 11.3	17.5	37

The final consideration in recommending sample sizes was to achieve roughly comparable detection capability for different size spills. The radius of the smallest contaminated circle certain to be sampled at least once by the sampling scheme is used for comparative purposes (see Table 2). Table 5 presents some calculations of this quantity. The absolute detection capability of the sampling scheme is seen to be relatively constant for different spill sizes. This means that a given area of residual contamination is about as likely to be detected in any sized spill.

Table 5. Detection Capability of the Recommended Sampling Schemes

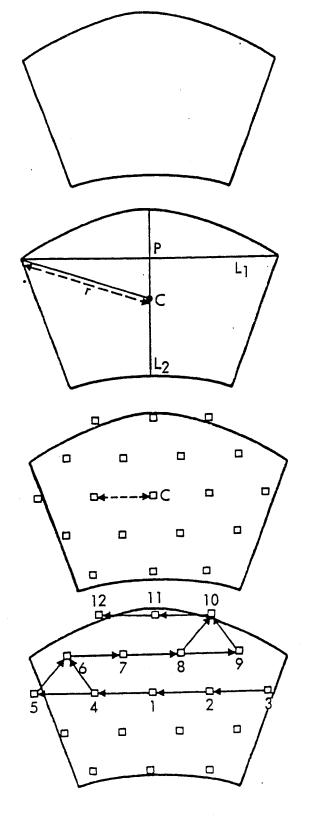
Sampling area (ft <sup>2</sup> )	Radius (ft)	Sample size	Radius of smallest circle to be sampled (ft)
50	4.0	7	2.0
150	6.9	19	1.9
. 400	11.3	19	3.2
875	16.7	37	3.2

### b. Design Layout in the Field

Figure 5 presents a typical illustration of design layout in the field. The first step is to determine the boundaries of the original cleanup area (from records of the cleanup). Next, find the center and radius of the sampling circle which is to be drawn surrounding the cleanup area. The following approach is recommended:

- (a) Draw the longest dimension,  $L_1$ , of the spill area.
- (b) Determine the midpoint, P, of  $L_1$ .
- (c) Draw a second dimension,  $L_2$ , through P perpendicular to  $L_1$ .
- (d) The midpoint, C, of  $L_2$  is the required center.
- (e) The distance from C to the extremes of  $L_1$  is the required radius, r.

Figure 5 shows an example of the procedure; Figure 6 demonstrates how the center is determined for several spill shapes. Even if the center determined is slightly off, the sampling design will not be adversely affected.



(a) Original cleanup area

(b) Locating the center of the sampling circle

(c) Centering the hexagonal grid

(d) Staking out the grid points

Figure 5

Once the sampling radius, r, has been found, the sample size can be selected based on Table 4.

Example: Suppose r = 5 ft. From Table 4, a sample size of 19 should be used.

Having selected the sample size, the grid spacing can be calculated from Table 2.

Example (continued): For a 19-point design with radius r = 5, the grid spacing is s = 0.48r = (0.48)(5) = 2.4 ft.

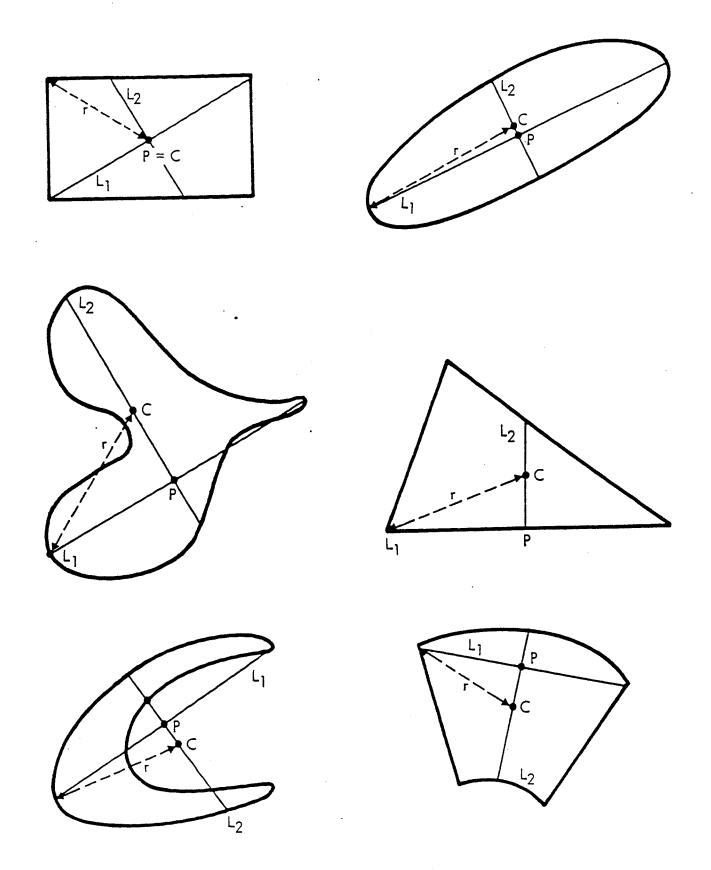
The procedure for laying out a 19 point design is as follows. The first sampling location is the center C of the sampling circle, as shown in Figure 5. Next, draw a diameter through C and stake out locations 2 through 5 on it as shown; adjacent locations are a distance s apart. The orientation of the diameter (for example east-west) used is not important; it may be chosen at random or for the convenience of the samplers. The next 4 locations, Nos. 6-9, are laid out parallel to the first row, again a distance s apart. The only difficulty is in locating the starting point, No. 6, for this row. To accomplish this the sampler needs two pieces of rope (or surveyor's chain, or equivalent measuring device) of length s. Attach one piece of rope to the stake at each location 4 and 5. Draw the ropes taut horizontally until they touch at location 6. Once the second row is laid out, the third and final row of 3 locations in the top half of the design is found similarly, starting with number 10. In the same way, the bottom half of the design is staked out. The 7-point or 37-point designs are laid out in an analogous fashion.

Once the sampling locations are staked out the actual samples can be collected. In the example in Figure 5, three of the sampling locations fall outside the original cleanup area. Samples should be taken at these points, to detect contamination beyond the original cleanup boundaries. This verifies that the original spill boundaries were accurately assessed.

In practice, various obstacles may be encountered in laying out the sampling grid. Many "obstacles" can be handled by taking a different type of sample, e.g., if a fire hydrant is located at a point in a sampling grid otherwise consisting of soil samples, then a wipe sample should be taken at the hydrant, rather than taking a sample of nearby soil. The obstacle most likely to be encountered is a vertical surface such as a wall. To determine the sampling location on such a surface, draw taut the ropes (chains) of length s attached to two nearby stakes and find the point on the vertical surface where their common ends touch. See Figure 7 for an illustration of the procedure. If more samples from the vertical surface are called for, the same principle may be applied, always using the last two points located to find the next one.

# 3. <u>Judgemental Sampling</u>

The inspector or sampling crew may use best judgement to collect samples wherever residual PCB contamination is suspected. These samples are



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Figure 6. Locating the center and sampling circle radius of an irregularly shaped spill area.

in addition to those collected from the sampling grid. Examples of extra sampling points include suspicious stains outside the designated spill area, cracks or crevices, and any other area where the inspector suspects inadequate cleanup.

# 4. Compositing Strategy for Analysis of Samples

Once the samples have been collected at a site, the goal of the analysis effort is to determine whether at least one sample has a PCB concentration above the allowable limit. This sampling plan assumes the entire spill area will be recleaned if a single sample contaminated above the limit is found. Thus, it is not important to determine precisely which samples are contaminated or even exactly how many. This means that the cost of analysis can be substantially reduced by employing compositing strategies, in which groups of samples are thoroughly mixed and evaluated in a single analysis. If the PCB level in the composite is sufficiently high, one can conclude that a contaminated sample is present; if the level is low enough, all individual samples are clean. For intermediate levels, the samples from which the composite was constructed must be analyzed individually to make a determination. Thus, the number of analyses needed is greatly reduced in the presence of very high levels of contamination in a few samples or in the presence of very low levels in most samples.

For purposes of this discussion, assume that the maximum allowable PCB concentration in a single soil sample is 10 ppm. The calculations can easily be adapted for a different level or for different types of samples. Based on review of the available precision and accuracy data (Erickson 1985), method performance of 80% accuracy and 30% relative standard deviation should be attainable for soil concentrations above 1 ppm.

To protect against false positive findings due to analytical error, the measured PCB level in a single sample must exceed some cutoff greater than 10 ppm for a finding of contamination. Assume that a 0.5% false positive rate for a single sample is desired. As will be shown later, this single sample false positive rate controls the <u>overall</u> false positive rate of the sampling schemes to acceptable levels. Then, using standard statistical techniques, the cutoff level for a single sample is

$$(0.8)(10) + (2.576)(0.3)(0.8)(10) = 14.2 \text{ ppm},$$

のおお墓が信息者が文献が名称。最近の経験が変な外ができます。 こうしょう はっぱん おおじな かけしなく

where 0.8(80%) represents the accuracy of the analytical method, 10 ppm is the allowable limit for a single sample, 2.576 is a coefficient from the standard normal distribution, and 0.3(30%) is the relative standard deviation of the analytical method. Thus, if the measured level in a single sample is 14.2 ppm or greater, one can be 99.5% sure that the  $\underline{\text{true}}$  level is 10 ppm or greater.

Now suppose that a composite of, say, 7 samples is analyzed. The true PCB level in the composite (assuming perfect mixing) is simply the average of the 7 levels of the individual samples. Let X ppm be the measured PCB level in the composite. If  $X \le (14.2/7) = 2.0$ , then all 7 individual samples

are rated clean. If X > 14.2, then at least one individual sample must be above the 10 ppm limit. If  $2.0 < X \le 14.2$ , no conclusion is possible based on analysis of the composite and the 7 samples must be analyzed individually to reach a decision. These results may be generalized to a composite of any arbitrary number of samples, subject to the limitations noted below.

The applicability of compositing is potentially limited by the size of the individual specimens and by the performance of the analytical method at low PCB levels. First, the individual specimens must be large enough so that the composite can be formed while leaving enough material for individual analyses if needed. For verification of PCB spill cleanup, adequacy of specimen sizes should not be a problem. The second limiting factor is the analytical method. Down to about 1 ppm, the performance of the stipulated analytical methods should not degrade markedly. Therefore, since the assumed permissible level is 10 ppm, no more than about 10 specimens should be composited at a time.

In compositing specimens, the location of the sampling points to be grouped should be taken into account. If a substantial residual area of contamination is present, then contaminated samples will be found close together. Thus, contiguous specimens should be composited, if feasible, in order to maximize the potential reduction in the number of analyses produced by the compositing strategy. Rather than describe a (very complicated) algorithm compositing specimens to composite, we have graphically indicated some possible compositing strategies in Figures 8 Through 11. Based on the error probability calculations presented in Section 4 below, we recommend the compositing strategies indicated in Table 6. The recommended strategy for the 7-point design requires no explanation. The strategies for the 19- and 37-point cases are shown in Figures 9 and 11, respectively. The strategies shown in Figures 8 and 10 are used in Section 5 for comparison purposes. For details on the reduction in number of analyses expected to result (as compared to individual analyses), see the next Section, 5.

# 5. <u>Calculations of Average Number of Analyses</u>, and Error Probabilities

Estimates of expected number of analyses and probabilities of false positives (incorrectly deciding the site is contaminated above the limit), and false negatives (failure to detect residual contamination) were obtained for various scenarios. The calculations were performed by Monte Carlo simulation using 5,000 trials for each combination of sample size, compositing strategy, level, and extent of residual contamination. The computations were based on the following assumptions:

a. Only soil samples are involved. In practice other types of samples will often be obtained and analyzed. Although the results of this section are not directly applicable to such cases, they do indicate in general terms the type of accuracy obtainable and the potential cost savings from compositing.

# APPENDIX B

LABORATORY REPORTS AND CHAIN-OF-CUSTODY DOCUMENTS FOR SOIL SAMPLES COLLECTED DURING THE INITIAL GRID SAMPLING AND FOLLOWING SOIL EXCAVATION



CORE LABORATORIES ANALYTICAL REPORT

> Job Number: 952182 Prepared For:

Environmental Science & Engineerng David Ferreira 17390 Brookhurst Street Fountain Valley, CA 92708

Date: 07/24/95

C A. E. L. A. P. 1174 L. A. C. S. D. 10146

le 1 l. Ward for 7/24/95 Date:

Name: Timothy A. Scott

Title: Laboratory Manager

Core Laboratories 1250 Gene Autry Way Anaheim, CA 92805



RESULTS LABORATORY TESTS

07/21/95

ATTN: David Ferreira CUSTOMER: Environmental Science & Engineerng JOB NUMBER: 952182

CLIENT I.D.....: Douglass Aircraft/6495203 DATE SAMPLED....: 07/18/95

TIME SAMPLED.....: 00:00'
WORK DESCRIPTION...: Composite of D1-D10 Former Trans. Area

LABORATORY I.D...: 952182-0011

DATE RECEIVED....: 07/19/95

TIME RECEIVED...: 11:30
REMARKS.....: Soil;1-Brass Sleeve

FEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECH
Sonication Extraction for PCBs	COMPLETED		N/A	EPA 3550	07/20/95	TH
Polychlorinated Biphenyls		<b>*</b> 1		EPA 8080	07/21/95	CIS
Aroclor-1016	ND	33	ug/kg	EPA 8080		
Aroctor-1016 Aroctor-1221	ND	33 33	ug/kg	EPA 8080		
Aroclor-1232	ND	33 33	ug/kg	EPA 8080		
Aroclor-1242	ND	33	ug/kg	EPA 8080		
Aroclor-1248	ND	33 33	ug/kg	EPA 8080	1	
Aroclor-1254	ND	33	ug/kg	EPA 8080		
Aroclor-1260	31000	33	ug/kg	EPA 8080		
Tetrachloro-m-xylene (SURROGATE)	54	0	% Recovery	QC LIMITS 40-130		
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PAGE:1

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LABORATORY 07/21/95 RESULTS

JOB NUMBER: 952182

CUSTOMER: Environmental Science & Engineerng

TESTS

ATTN: David Ferreira

LABORATORY I.D...: 952182-0022 DATE RECEIVED....: 07/19/95

TIME RECEIVED....: 11:30

CLIENT I.D.....: Douglass Aircraft/6495203
DATE SAMPLED....: 07/18/95
TIME SAMPLED....: 00:00
WORK DESCRIPTION...: Composite of D11-D20 Former Trans. Area

REMARKS..... Soil;1-Brass Sleeve

					100000000000000000000000000000000000000	annania.
TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Sonication Extraction for PCBs	COMPLETED		N/A	EPA 3550	07/20/95	TH
Polychlorinated Biphenyls		*1		EPA 8080	07/21/95	CIS
Polychlorinated Biphenyls  Aroclor-1016 Aroclor-1221 Aroclor-1232 Aroclor-1242 Aroclor-1254 Aroclor-1254 Aroclor-1260 Tetrachloro-m-xylene (SURROGATE)	ND ND ND ND ND 4700 54	*1 33 33 33 33 33 33 0	ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg % Recovery	EPA 8080 EPA	07/21/95	CIS

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TESTS RESULTS LABORATORY

07/21/95

ATTN: David Ferreira JOB NUMBER: 952182 CUSTOMER: Environmental Science & Engineerng

CLIENT I.D.....: Douglass Aircraft/6495203

DATE SAMPLED....: 07/18/95 TIME SAMPLED...: 00:00

WORK DESCRIPTION...: Composite of D21-D40 Former Trans. Area

LABORATORY I.D...: 952182-0033

DATE RECEIVED....: 07/19/95

TIME RECEIVED...: 11:30
REMARKS....: Soil;1-Brass Sleeve

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Sonication Extraction for PCBs	COMPLETED		N/A	EPA 3550	07/20/95	TH
Polychlorinated Biphenyls		*1		EPA 8080	07/21/95	CIS
Aroclor-1016	ND	33	ug/kg	EPA 8080		
Aroclor-1221	ND	33	lug/kg	EPA 8080 EPA 8080		
Aroclor-1232	ND ND	33 33	ug/kg ug/kg	EPA 8080		
Aroclor-1242 Aroclor-1248	ND ND	33	ug/kg ug/kg	EPA 8080		
Aroctor-1246 Aroctor-1254	ND	33	ug/kg	EPA 8080		
Aroctor 1254 Aroctor-1260	1700	33 0	ug/kg	EPA 8080		
Tetrachloro-m-xylene (SURROGATE)	53	0	% Recovery	QC LIMITS 40-130		
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RESULTS LABORATORY TESTS

07/21/95

WORK DESCRIPTION...: Composite of D25-1-D31-15 Fmr.Trans.Area

JOB NUMBER: 952182

TIME SAMPLED.....: 00:00

CLIENT I.D.....: Douglass Aircraft/6495203 DATE SAMPLED.....: 07/18/95

CUSTOMER: Environmental Science & Engineerng

ATTN: David Ferreira

LABORATORY I.D...: 952182-0043 DATE RECEIVED ....: 07/19/95

TIME RECEIVED...: 11:30

REMARKS..... Soil;1-Brass Sleeve

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHI
Sonication Extraction for PCBs	COMPLETED		N/A	EPA 3550	07/20/95	TH
Polychlorinated Biphenyls		*1		EPA 8080	07/21/95	CIS
Aroclor-1016 Aroclor-1221 Aroclor-1232 Aroclor-1242 Aroclor-1248 Aroclor-1254 Aroclor-1260 Tetrachloro-m-xylene (SURROGATE)	ND ND ND ND ND 3700 55	33 33 33 33 33 33 33 0	ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg % Recovery	EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 QC LIMITS 40-130		

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LABORATORY TESTS RESULTS

07/21/95

JOB NUMBER: 952182 CUSTOMER: Environmental Science & Engineering ATTN: David Ferreira

CLIENT I.D..... Douglass Aircraft/6495203

DATE SAMPLED.....: 07/18/95
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: D27-1 Former Transformer Area

LABORATORY I.D...: 952182-0044

DATE RECEIVED...: 07/19/95 TIME RECEIVED...: 11:30

REMARKS..... Soil;1-Brass Sleeve

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Sonication Extraction for PCBs	COMPLETED		N/A	EPA 3550	07/20/95	TH
		*1000	'	EPA 8080	07/21/95	CIS
Polychlorinated Biphenyls					01/21/23	010
Aroclor-1016 Aroclor-1221	ND ND	33000 33000	ug/kg ug/kg	EPA 8080 EPA 8080		
Aroctor-1221 Aroctor-1232	ND ND	33000	ug/kg	EPA 8080		
Aroclor-1242	ND	33000	ug/kg	EPA 8080		
Aroclor-1248	ND	33000	lug/kg	EPA 8080		
Aroclor-1254	ND	33000	ug/kg	EPA 8080		
Aroclor-1260	3500000	33000	ug/kg	EPA 8080		
Tetrachloro-m-xylene (SURROGATE)	0(b)	0	% Recovery	QC LIMITS 40-130		
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LABORATORY RESULTS TESTS

07/21/95

David Ferreira CUSTOMER: Environmental Science & Engineering ATTN: JOB NUMBER: 952182

CLIENT I.D..... Douglass Aircraft/6495203

LABORATORY I.D...: 952182-0045 DATE RECEIVED....: 07/19/95

DATE SAMPLED....: 07/18/95 TIME SAMPLED....: 00:00

WORK DESCRIPTION...: D27-5 Former Transformer Area

TIME RECEIVED...: 11:30
REMARKS.....: Soil;1-Brass Sleeve

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Sonication Extraction for PCBs	COMPLETED		N/A	EPA 3550	07/20/95	TH
Polychlorinated Biphenyls		*100		EPA 8080	07/21/95	CIS
Aroclor-1016 Aroclor-1221 Aroclor-1232 Aroclor-1242 Aroclor-1248 Aroclor-1254 Aroclor-1260 Tetrachloro-m-xylene (SURROGATE)	ND ND ND ND ND 220000 54	3300 3300 3300 3300 3300 3300 0	ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg % Recovery	EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 QC LIMITS 40-130		

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TESTS LABORATORY 07/21/95

RESULTS

JOB NUMBER: 952182

DATE SAMPLED....: 07/18/95 TIME SAMPLED....: 00:00

WORK DESCRIPTION...: D32-1 Former Transformer Area

CLIENT I.D..... Douglass Aircraft/6495203

CUSTOMER: Environmental Science & Engineering

ATTN: David Ferreira

LABORATORY I.D...: 952182-0046

DATE RECEIVED ....: 07/19/95

TIME RECEIVED...: 11:30'
REMARKS.....: Soil;1-Brass Sleeve

FEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECH
Sonication Extraction for PCBs	COMPLETED		N/A	EPA 3550	07/20/95	TH
olychlorinated Biphenyls		*1		EPA 8080	07/21/95	CIS
Aroclor-1016 Aroclor-1221 Aroclor-1232 Aroclor-1242 Aroclor-1248 Aroclor-1254 Aroclor-1260 Tetrachloro-m-xylene (SURROGATE)	ND ND ND ND ND ND 54	33 33 33 33 33 33 33 0	ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg % Recovery	EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 QC LIMITS 40-130		

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TESTS LABORATORY

07/21/95

ATTN: David Ferreira CUSTOMER: Environmental Science & Engineerng JOB NUMBER: 952182

CLIENT I.D.....: Douglass Aircraft/6495203 DATE SAMPLED....: 07/18/95

TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: D32-6 Former Transformer Area

LABORATORY I.D...: 952182-0047

DATE RECEIVED....: 07/19/95

RESULTS

TIME RECEIVED...: 11:30
REMARKS.....: Soil;1-Brass Sleeve

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Sonication Extraction for PCBs	COMPLETED		N/A	EPA 3550	07/20/95	TH
Polychlorinated Biphenyls		*1		EPA 8080	07/21/95	CIS
Aroclor-1016 Aroclor-1221 Aroclor-1232 Aroclor-1242 Aroclor-1248 Aroclor-1254 Aroclor-1260 Tetrachloro-m-xylene (SURROGATE)	ND ND ND ND ND ND S4	33 33 33 33 33 33 33 0	ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg % Recovery	EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 QC LIMITS 40-130		
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LABORATORY TESTS RESULTS

07/21/95

ATTN: David Ferreira CUSTOMER: Environmental Science & Engineering JOB NUMBER: 952182

CLIENT I.D..... Douglass Aircraft/6495203

DATE SAMPLED....: 07/18/95 TIME SAMPLED....: 00:00

WORK DESCRIPTION...: D32-11 Former Transformer Area

LABORATORY I.D...: 952182-0048

DATE RECEIVED....: 07/19/95 TIME RECEIVED...: 11:30

REMARKS..... Soil;1-Brass Sleeve

EST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECH
onication Extraction for PCBs	COMPLETED		N/A	EPA 3550	07/20/95	TH
olychlorinated Biphenyls		*1		EPA 8080	07/21/95	CIS
Aroclor-1016 Aroclor-1221 Aroclor-1232 Aroclor-1242 Aroclor-1248 Aroclor-1254 Aroclor-1260 Tetrachloro-m-xylene (SURROGATE)	ND ND ND ND ND 3100	33 33 33 33 33 33 33 0	ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg % Recovery	EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 QC LIMITS 40-130		
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LABORATORY TESTS RESULTS

07/21/95

CLIENT I.D...... Douglass Aircraft/6495203

TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: D37-1 Former Transformer Area

JOB NUMBER: 952182

DATE SAMPLED.....: 07/18/95

CUSTOMER: Environmental Science & Engineerng

ATTN: David Ferreira

LABORATORY I.D...: 952182-0049 DATE RECEIVED....: 07/19/95

TIME RECEIVED...: 11:30

REMARKS..... Soil;1-Brass Sleeve

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECH
Sonication Extraction for PCBs	COMPLETED		N/A	EPA 3550	07/20/95	TH
Polychlorinated Biphenyls		*10		EPA 8080	07/21/95	CIS
Polychlorinated Biphenyls  Aroclor-1016 Aroclor-1221 Aroclor-1232 Aroclor-1242 Aroclor-1254 Aroclor-1254 Aroclor-1260 Tetrachloro-m-xylene (SURROGATE)	ND ND ND ND ND 8300 54	*10 330 330 330 330 330 330 330 0	ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg % Recovery	EPA 8080  CEPA 8080  EPA 8080	07/21/95	CIS

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LABORATORY

TESTS

RESULTS

07/21/95

JOB NUMBER: 952182

CUSTOMER: Environmental Science & Engineering

ATTN: David Ferreira

CLIENT I.D..... Douglass Aircraft/6495203

DATE SAMPLED....: 07/18/95
TIME SAMPLED....: 00:00

WORK DESCRIPTION...: D37-6 Former Transformer Area

LABORATORY I.D...: 952182-0050 DATE RECEIVED...: 07/19/95 TIME RECEIVED...: 11:30

REMARKS..... Soil; 1-Brass Sleeve

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Sonication Extraction for PCBs	COMPLETED		N/A	EPA 3550	07/20/95	тн
Polychlorinated Biphenyls		*1		EPA 8080	07/21/95	cis
Aroclor-1016 Aroclor-1221 Aroclor-1232 Aroclor-1242 Aroclor-1248 Aroclor-1254 Aroclor-1260 Tetrachloro-m-xylene (SURROGATE)	ND ND ND ND ND 180 51	33 33 33 33 33 33 33 0	ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg % Recovery	EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 QC LIMITS 40-130		

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RESULTS LABORATORY TESTS

07/21/95

ATTN: David Ferreira JOB NUMBER: 952182 CUSTOMER: Environmental Science & Engineerng

CLIENT I.D.....: Douglass Aircraft/6495203 DATE SAMPLED....: 07/18/95

LABORATORY I.D...: 952182-0051 DATE RECEIVED....: 07/19/95

TIME RECEIVED...: 11:30

TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: D37-12 Former Transformer Area

REMARKS..... Soil;1-Brass Sleeve

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Sonication Extraction for PCBs	COMPLETED		N/A	EPA 3550	07/20/95	TH
Polychlorinated Biphenyls		*1		EPA 8080	07/21/95	cis
Aroclor-1016 Aroclor-1221 Aroclor-1232 Aroclor-1242 Aroclor-1248 Aroclor-1254 Aroclor-1260 Tetrachloro-m-xylene (SURROGATE)	ND ND ND ND ND 110 51	33 33 33 33 33 33 33 0	ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg % Recovery	EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 QC LIMITS 40-130		

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LABORATORY TESTS RESULTS

07/21/95

JOB NUMBER: 952182 CUSTOMER: Envi

CLIENT I.D..... Douglass Aircraft/6495203

DATE SAMPLED.....: 07/18/95
TIME SAMPLED.....: 00:00
WORK DESCRIPTION...: Composite of D35-1-D38-11 Fmr.Trans.Area

CUSTOMER: Environmental Science & Engineering

ATTN: David Ferreira

LABORATORY I.D...: 952182-0060 DATE RECEIVED...: 07/19/95

TIME RECEIVED...: 11:30

REMARKS...... Soil;1-Brass Sleeve

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECH
Sonication Extraction for PCBs	COMPLETED		N/A	EPA 3550	07/20/95	TH
Polychlorinated Biphenyls		*1		EPA 8080	07/21/95	cis
Aroclor-1016 Aroclor-1221 Aroclor-1232 Aroclor-1242 Aroclor-1248 Aroclor-1254 Aroclor-1260 Tetrachloro-m-xylene (SURROGATE)	ND ND ND ND ND ND S3	33 33 33 33 33 33 33 0	ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg % Recovery	EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 QC LIMITS 40-130		

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PAGE:13

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ASSURANCE REPORT QUALITY

07/21/95

ATTN: David Ferreira CUSTOMER: Environmental Science & Engineering JOB NUMBER: 952182

ANALYZED: 07/21/95 TIME ANALYZED: 00:00 METHOD: EPA 8080

QC NUMBER: 944761

PCBs by EPA 8080	DATE ANALYZE	D: 07/21/95 TIM	E ANALYZED: 00:00	METHOD: EPA 80	80 Q	C NUMBER: 944761
		BLA	n K S			
EST DESCRIPTION	ANALY SUB-TYP	E ANALYSIS I.D.	DILUTION FACTOR	ANALYZED VALUE	DETECTION LIMIT	UNITS OF MEASUR
Aroclor-1016 Aroclor-1221 Aroclor-1232 Aroclor-1242 Aroclor-1248 Aroclor-1254 Aroclor-1260 Tetrachloro-m-xylene (SURROGATE)	ANALY SUB-TYP  METHOD METHOD METHOD METHOD METHOD METHOD METHOD METHOD	072095 072095 072095 072095 072095 072095 072095 072095	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	ANALYZED VALUE <33 <33 <33 <33 <33 <33 <55	33 33 33 33 33 33 33 0	ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg % Recovery

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PAGE:14

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A S S U R A N C E 07/21/95 QUALITY REPORT

CUSTOMER: Environmental Science & Engineerng ATTN: David Ferreira JOB NUMBER: 952182

PCBs by EPA 8080

DATE ANALYZED: 07/21/95 TIME ANALYZED: 00:00 METHOD: EPA 8080

QC NUMBER: 944761

		-	MATRIX	SPIK	E S				
TEST DESCRIPTION	ANALYSIS SUB-TYPE	ANALYSIS I. D.	DILUTION FACTOR	ANALYZED VALUE	ORIGINAL VALUE	SPIKE ADDED	PERCENT RECOVERY	DETECTION LIMITS	UNITS OF MEASURE
Aroclor-1254 Tetrachloro-m-xylene (SURROGAT	MATRIX MATRIX DUP MATRIX MATRIX DUP	952057-53	1 1 1	470 500 56 60	0 0 0 0	330 330 100 100	142 152 56 60	33 33 0 0	ug/kg ug/kg % Recovery % Recovery

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PAGE:15

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#### QUALITY ASSURANCE FOOTER

#### METHOD REFERENCES

- (1) EPA SW-846, Test Methods for Evaluating Solid Waste, Third Edition, November 1990, and July 1992 update
- (2) Standard Methods for the Examination of Water and Wastewater, 17th Edition, 1989
- (3) EPA 600/4-79-020, Methods of Chemical Analysis for Waters and Wastes, March 1983
- (4) Federal Register, Friday, October 26, 1984 (40 CFR Part 136)
- (5) American Society for Testing and Materials, Volumes 5.01, 5.02, 5.03, 1992
- (6) EPA 600/4-89-001, Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Fresh Water Organisms
- (7) EPA 600/4-90-027, Methods for Measuring the Acute Toxicity of Effluent and Receiving Waters to Fresh Water and Marine Organisms, Fourth Edition

#### COMMENTS

All methods of chemical analysis have a statistical uncertainty associated with the results. Unless otherwise indicated, the data in this report are within the limits of uncertainty as specified in the referenced method. Quality control acceptance criteria are based either on actual laboratory performance or on limits specified in the referenced method. The date and time of analysis indicated on the QA report may not reflect the actual time of analysis for QC samples. All data reported on an "as received" basis unless otherwise indicated. Data reported in the QA report may be lower than sample data due to dilution of samples into the calibration range of the analysis. Sample concentrations for solid samples are calculated on an as received (wet) basis. Unless otherwise indicated, volatiles by gas chromatograpy are reported from a single column. Volatiles analyses on low level soils are conducted at room temperature.

#### FLAGS, FOOTNOTES, AND ABBREVIATIONS (as needed)

	= Not analyzed	N.I.	= Not Ignitable
		9.1	= Sustains Ignition
N/A	= Not applicable	3.1.	- Oustains ignition

N/A = Not applicable I(NS) = Ignites, but does not Sustain Ignition

ug/L = Micrograms per liter = Relative Percent Difference RPD mg/L = Milligrams per liter

= Not detected at a value greater than the reporting limit ND

= Not calculable due to values lower than the detection limit

= Surrogate recoveries were outside acceptable ranges due to matrix effects. (a)

= Surrogate recoveries were not calculated due to dilution of the sample below the detectable range for the surrogate. (b)

= Matrix spike recoveries were outside acceptable ranges due to matrix effects. (c)

= Relative Percent Difference (RPD) for duplicate analysis outside acceptance limits due to actual differences in (d) = The limit listed for flammability indicates the upper limit for the test. Samples are not tested at temperatures the sample matrix. (e)

above 140 Fahrenheit since only samples which will sustain ignition at temperatures below 140 are considered flammable.

= Results for this hydrocarbon range did not match a typical hydrocarbon pattern. Results were quantified using a (f) diesel standard, however, the hydrocarbon pattern did not match a diesel pattern.

= Results for this hydrocarbon range did not match a typical hydrocarbon pattern. Results were quantified using a gasoline standard, however, the hydrocarbon pattern did not match a gasoline pattern.

= High dilution due to matrix effects (h)

= Samples with results below 500 mg/L are considered hazardous (i)

#### QC SAMPLE IDENTIFICATIONS

MB = Method Blank RB = Reagent Blank ICB = Initial Calibration Blank CCB = Continuing Calibration Blank BS = Blank Spike CS = Calibration Standard ICB = Initial Calibration Verification

CCV = Continuing Calibration Verification

SB = Storage Blank MS = Matrix Spike MSD = Matrix Spike Duplicate MD = Matrix Duplicate

SS = Surrogate Spike LCS = Laboratory Control Standard

RS = Reference Standard

#### SUBCONTRACTED LABORATORY LOCATIONS

Core Laboratories: Aurora, Colorado(ELAP #1933) \*AU Casper, Wyoming \*CA \*CC Corpus Christi, Texas \*HP Houston, Texas \*LC Lake Charles, Louisiana \*LB Long Beach, California

Aquatic Testing Laboratories:

Ventura, California \*AT

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Rev. 23 /usr/nick/wpwork/qafooter23 8/12/94

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17390 BROOKHURST STREET SUITE 110 FOUNTAIN VALLEY, CA 92708 PHONE: (714) 964-8722 FAX: (714) 962-3383

# **CHAIN-OF-CUSTODY RECORD**

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17390 BROOKHURST STREET SUITE 110 FOUNTAIN VALLEY, CA 92708 PHONE: (714) 964-8722 FAX: (714) 962-3383

# CHAIN-OF-CUSTODY RECORD DATE 7/18 PAGE Z-OF 6

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# CHAIN-OF-CUSTODY RECORD

DATE 7/18 PAGE 3 OF 6.

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# CHAIN-OF-CUSTODY RECORD

DATE 7/18 PAGE 4 OF 6

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# **CHAIN-OF-CUSTODY RECORD**

DATE 7/18 PAGE 5 OF 6

PROJECT NAME Douglass		ANALYSE	S TO BE PE	RFORMED		RS RS
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# **CHAIN-OF-CUSTODY RECORD**

DATE 7/18 PAGE 6 OF 6

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17390 BROOKHURST STREET FOUNTAIN VALLEY, CA 92708 SUITE 110

# CHAIN-OF-CUSTODY RECORD DATE 7/18 PAGE 1 OF 6

PHONE: (714) 964-8722 FAX: (714) 962-3383 ENGIRZERING, INC. ANALYSES TO BE PERFORMED Done, lass Aircraft - Torranca-REMARKS (MATRIX, CONTAINER, 808 SIZE, ETC.) 6.495 203 ECT NO. Š. PLED BY \_\_ Pc.Bs Core NAME. LOCATION TIME DATE SAMPLE ID Former Transform 7/18/9 200 10:D10 11-Comp 1-10 TURN AROUND TIME DATE (PRINT) RECEIVED BY 24 Hr.\_\_\_\_\_5 DAY\_\_X RELINQUISHED BY (PRINT) DATE DATE (PRINT) RELINQUISHED BY (PRINT) DATE | RECEIVED BY 2-DAY \_\_\_\_REGULAR\_ David Ferreira 7/9/ SEE SIZEMONG SIGNATURE! SHIPMENT REQUIREMENTS SIGNATURE TIME TIME COMPANY NAME SIGNATURE TIME COMPANY NAME SAMPLE RECEIPT COMPANY, NAME TOTAL NO. OF CONTAINERS CORE BOE-C6-0220774 COMPANY NAME CHAIN OF CUSTODY SEALS PECIAL INSTRUCTIONS (HANDLING, ANALYSES, DETECTION LIMIT, STORAGE, ETC.) REC'D GOOD CONDIN/COLD CONFORMS TO RECORD Composite 10:1



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# CHAIN-OF-CUSTODY RECORD DATE 7/13 PAGE 7- OF (2)

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# CHAIN-OF-CUSTODY RECORD

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# CHAIN-OF-CUSTODY RECORD

DATE 7/13 PAGE 4 OF 6

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# CHAIN-OF-CUSTODY RECORD

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# CHAIN-OF-CUSTODY RECORD

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CORE LABORATORIES
ANALYTICAL REPORT

Job Number: 952275 Prepared For:

Environmental Science & Engineerng David Ferreira 17390 Brookhurst Street Fountain Valley, CA 92708

Date: 08/02/95

Signature

Name: Timothy A. Scott

Core Laboratories 1250 Gene Autry Way Anaheim, CA 92805

Title: Laboratory Manager

C A. E. L. A. P. 1174 L A. C. S. D. 10146



TESTS LABORATORY

08/02/95

JOB NUMBER: 952275

CUSTOMER: Environmental Science & Engineerng

ATTN: David Ferreira

RESULTS

IENT I.D....: Douglass Aircraft-Torrance
part SAMPLED....: 07/18/95
TIME SAMPLED....: 00:09

LABORATORY I.D...: 952275-0001 DATE RECEIVED...: 07/26/95 TIME RECEIVED ....: 09:47

MORK DESCRIPTION...: D1

REMARKS..... Soil; Brass Sleeve

Anaheim, CA 92805 (714) 937-1094

FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECH
COMPLETED		N/A	EPA 3550	07/27/95	TH
	*1		EPA 8080	07/27/95	CIS
	[	Dem	EPA 8080		
	33	lug/kg	EPA 8080		
	33	lug/kg	EPA 8080		
ND	33	ug/kg	EPA 8080	1	
ND	33	ug/kg	FPA 8080	}	
	33	ug/kg lug/kg	EPA 8080		
•	0	% Recovery	QC LIMITS 40-130		
44	-				
	a de la companya de l				
	COMPLETED  ND ND ND ND ND	COMPLETED  *1  ND 33  ND 33  ND 33  ND 33  ND 33  ND 33  ND 33  ND 33  ND 33  ND 33	COMPLETED N/A  *1  ND 33 ug/kg  ND 33 ug/kg  ND 33 ug/kg  ND 33 ug/kg  ND 33 ug/kg  ND 33 ug/kg  ND 33 ug/kg  ND 33 ug/kg  ND 33 ug/kg  ND 33 ug/kg	COMPLETED	COMPLETED

PAGE:1

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TESTS RESULTS LABORATORY 08/02/95

JOB NUMBER: 952275

CUSTOMER: Environmental Science & Engineerng

ATTN: David Ferreira

.IENT I.D.....: Douglass Aircraft-Torrance

WORK DESCRIPTION...: D2

LABORATORY I.D...: 952275-0002 DATE RECEIVED...: 07/26/95

TIME RECEIVED...: 09:47
REMARKS..... Soil; Brass Sleeve

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
onication Extraction for PCBs	COMPLETED		N/A	EPA 3550	07/27/95	тн
Polychlorinated Biphenyls		*1		EPA 8080	07/27/95	CIS
Aroclor-1016 Aroclor-1221 Aroclor-1232 Aroclor-1242 Aroclor-1248 Aroclor-1254 Aroclor-1260 Tetrachloro-m-xylene (SURROGATE)	ND ND ND ND ND ND 170 69	33 33 33 33 33 33 33 0	ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg % Recovery	EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 GC LIMITS 40-130		
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PAGE:2

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LABORATORY TESTS RESULTS

08/02/95

JOB NUMBER: 952275

CUSTOMER: Environmental Science & Engineerng

ATTN: David Ferreira

IENT I.D....: Douglass Aircraft-Torrance
TIE SAMPLED...: 07/18/95
TIME SAMPLED...: 00:09
WORK DESCRIPTION..: D3

LABORATORY I.D...: 952275-0003 DATE RECEIVED ...: 07/26/95

TIME RECEIVED...: 09:47
REMARKS..... Soil; Brass Sleeve

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
onication Extraction for PCBs	COMPLETED		N/A	EPA 3550	07/27/95	TH
Polychlorinated Biphenyls		*1		EPA 8080	07/27/95	CIS
Aroclor-1016 Aroclor-1221 Aroclor-1232 Aroclor-1242 Aroclor-1248 Aroclor-1254 Aroclor-1260 Tetrachloro-m-xylene (SURROGATE)	ND ND ND ND ND ND ND 48	33 33 33 33 33 33 33 0	ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg % Recovery	EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 QC LIMITS 40-130		
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PAGE:3

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RESULTS TESTS LABORATORY

08/02/95

CUSTOMER: Environmental Science & Engineerng JB NUMBER: 952275

ATTN: David Ferreira

IENT I.D....: Douglass Aircraft-Torrance NTE SAMPLED....: 07/18/95
TIME SAMPLED....: 00:09

WORK DESCRIPTION...: D4

LABORATORY I.D...: 952275-0004 DATE RECEIVED...: 07/26/95 TIME RECEIVED...: 09:47
REMARKS..... Soil; Brass Sleeve

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
onication Extraction for PCBs	COMPLETED		N/A	EPA 3550	07/27/95	TH
Polychlorinated Biphenyls		*200		EPA 8080	07/27/95	CIS
Aroclor-1016 Aroclor-1221 Aroclor-1232 Aroclor-1242 Aroclor-1248 Aroclor-1254 Aroclor-1250 Tetrachloro-m-xylene (SURROGATE)	ND ND ND ND ND 90000 O(b)	6600 6600 6600 6600 6600 6600 0	ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg % Recovery	EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 QC LIMITS 40-130		

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PAGE:4

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RESULTS TESTS

08/02/95

JB NUMBER: 952275

CUSTOMER: Environmental Science & Engineerng

ATTN: David Ferreira

LABORATORY I.D...: 952275-0005 DATE RECEIVED...: 07/26/95

\_IENT I.D.....: Douglass Aircraft-Torrance ATE SAMPLED.....: 07/18/95

TIME SAMPLED..... 00:09
WORK DESCRIPTION...: D5

TIME RECEIVED...: 09:47
REMARKS..... Soil; Brass Sleeve

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD		TECHN
onication Extraction for PCBs	COMPLETED		N/A	EPA 3550	07/27/95	TH
Polychlorinated Biphenyls		*1		EPA 8080	07/27/95	CIS
Aroclor-1016 Aroclor-1221 Aroclor-1232 Aroclor-1242 Aroclor-1248 Aroclor-1254 Aroclor-1260 Tetrachloro-m-xylene (SURROGATE)	ND ND ND ND ND 340 55	33 33 33 33 33 33 33 0	ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg % Recovery	EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 QC LIMITS 40-130		
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PAGE:5

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LABORATORY TESTS RESULTS

08/02/95

uoB NUMBER: 952275 CUSTOMER: Environmental Science & Engineerng ATTN: David Ferreira

IENT I.D.....: Douglass Aircraft-Torrance

TE SAMPLED...... 07/18/95
TIME SAMPLED...... 00:09
WORK DESCRIPTION...: D6

LABORATORY I.D..: 952275-0006
DATE RECEIVED...: 07/26/95

TIME RECEIVED...: 09:47
REMARKS.....: Soil; Brass Sleeve

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST: METHOD	DATE	TECHN
nication Extraction for PCBs	COMPLETED		N/A	EPA 3550	07/27/95	TH
Polychlorinated Biphenyls		*1		EPA 8080	07/27/95	CIS
Aroclor-1016 Aroclor-1221 Aroclor-1232 Aroclor-1242 Aroclor-1248 Aroclor-1254 Aroclor-1260 Tetrachloro-m-xylene (SURROGATE)	ND ND ND ND ND ND 95	33 33 33 33 33 33 33 0	ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg % Recovery	EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 QC LIMITS 40-130		
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RESULTS TESTS

08/02/95

JUB NUMBER: 952275

CUSTOMER: Environmental Science & Engineerng

ATTN: David Ferreira

IENT I.D....: Douglass Aircraft-Torrance

LABORATORY I.D...: 952275-0007

DATE RECEIVED...: 07/26/95 TIME RECEIVED...: 09:47

WORK DESCRIPTION...: D7

REMARKS..... Soil; Brass Sleeve

	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
TEST DESCRIPTION	COMPLETED		N/A	EPA 3550	07/27/95	ТН
nication Extraction for PCBs	COMPLETED	*1		EPA 8080	07/27/95	cis
Polychlorinated Biphenyls			,,	EPA 8080		
Aroclor-1016	ND ND	33 33	ug/kg ug/kg	EPA 8080		
Aroclor-1221 Aroclor-1232	ND	33	ug/kg	EPA 8080 EPA 8080		
Aroclor-1242	ND ND	33 33	ug/kg ug/kg	EPA 8080	i.	
Aroclor-1248 Aroclor-1254	ND	33	ug/kg	EPA 8080 EPA 8080		
Aroctor-1260	ND SATE) 53	33 0	ug/kg % Recovery	QC LIMITS 40-130		
Tetrachloro-m-xylene (SURROG	SATE					
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PAGE:7

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RESULTS TESTS LABORATORY

08/02/95

ATTN: David Ferreira CUSTOMER: Environmental Science & Engineering JUB NUMBER: 952275

IENT I.D..... Douglass Aircraft-Torrance

TE SAMPLED....: 07/18/95 TIME SAMPLED....: 00:09

WORK DESCRIPTION...: D8

LABORATORY I.D...: 952275-0008 DATE RECEIVED...: 07/26/95 TIME RECEIVED...: 09:47

REMARKS..... Soil; Brass Sleeve

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
nication Extraction for PCBs	COMPLETED		N/A	EPA 3550	07/27/95	TH
Polychlorinated Biphenyls		*1		EPA 8080	07/27/95	CIS
Aroclor-1016 Aroclor-1221 Aroclor-1232 Aroclor-1242 Aroclor-1248 Aroclor-1254 Aroclor-1260 Tetrachloro-m-xylene (SURROGATE)	ND ND ND ND ND ND ND AD AD AD AD	33 33 33 33 33 33 0	ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg % Recovery	EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 QC LIMITS 40-130		
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PAGE:8

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LABORATORY

TESTS RESULTS

08/02/95

JUB NUMBER: 952275

CUSTOMER: Environmental Science & Engineering

ATTN: David Ferreira

IENT I.D.....: Douglass Aircraft-Torrance

WORK DESCRIPTION...: D9

LABORATORY I.D...: 952275-0009

DATE RECEIVED....: 07/26/95

TIME RECEIVED...: 09:47

REMARKS..... Soil; Brass Sleeve

	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
TEST DESCRIPTION			N/A	EPA 3550	07/27/95	TH
nication Extraction for PCBs	COMPLETED		.,	EPA 8080	07/27/95	cis
Polychlorinated Biphenyls		*1			01/21/22	
Aroclor-1016	ND	33	ug/kg	EPA 8080 EPA 8080		
Aroctor-1010 Aroctor-1221	ND	33	ug/kg	EPA 8080	ł	
Aroclor-1232	ND	33	ug/kg	EPA 8080		
Aroclor-1242	ND	33 33	ug/kg ug/kg	EPA 8080		
Aroclor-1248	ND	33	ug/kg	EPA 8080		
Aroclor-1254	ND ND	33	ug/kg	EPA 8080	ĺ	
Aroclor-1260	68	1 0	% Recovery	QC LIMITS 40-130		
Tetrachloro-m-xylene (SURROGATE)	00					
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PAGE:9

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LABORATORY

TESTS RESULTS

08/02/95

JOB NUMBER: 952275

CUSTOMER: Environmental Science & Engineerng

ATTN: David Ferreira

.IENT I.D..... Douglass Aircraft-Torrance

LABORATORY I.D...: 952275-0010 DATE RECEIVED....: 07/26/95

TIME RECEIVED...: 09:47
REMARKS....: Soil; Brass Sleeve

...TE SAMPLED...... 07/18/95 TIME SAMPLED...... 00:09 WORK DESCRIPTION ...: D10

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
onication Extraction for PCBs	COMPLETED		N/A	EPA 3550	07/27/95	TH
Polychlorinated Biphenyls		<b>*</b> 1		EPA 8080	07/27/95	CIS
Aroclor-1016 Aroclor-1221 Aroclor-1232 Aroclor-1242 Aroclor-1248 Aroclor-1254 Aroclor-1260 Tetrachloro-m-xylene (SURROGATE)	ND ND ND ND ND 150	33 33 33 33 33 33 33 0	ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg % Recovery	EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 QC LIMITS 40-130		
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PAGE:10

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LABORATORY

RESULTS TESTS

08/02/95

JUB NUMBER: 952275

CUSTOMER: Environmental Science & Engineerng

ATTN: David Ferreira

LABORATORY I.D...: 952275-0011
DATE RECEIVED...: 07/26/95
TIME RECEIVED...: 09:47

IENT I.D....: Douglass Aircraft-Torrance
TE SAMPLED...: 07/18/95
TIME SAMPLED...: 00:09

WORK DESCRIPTION...: D11

REMARKS.....: Soil; Brass Sleeve

				E	DATE	TECHN
TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD		
nication Extraction for PCBs	R		N/A	EPA 3550	07/27/95	TH
Polychlorinated Biphenyls		*1		EPA 8080	07/31/95	CIS
	ND	33	ug/kg	EPA 8080		
Aroclor-1016 Aroclor-1221	ND	33	ug/kg	EPA 8080 EPA 8080		
Aroclor-1232	ND ND	33 33 33	ug/kg ug/kg	EPA 8080		
Aroclor-1242 Aroclor-1248	ND	33	ug/kg	EPA 8080 EPA 8080		
Aroclor-1254	ND	33 33	ug/kg ug/kg	EPA 8080		
Aroclor-1260 Tetrachloro-m-xylene (SURROGATE)	660	0	% Recovery	QC LIMITS 40-130		
Tetracitoro in xy cono (somestica)						
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PAGE:11

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RESULTS TESTS LABORATORY

08/02/95

CUSTOMER: Environmental Science & Engineerng JOB NUMBER: 952275

ATTN: David Ferreira

IENT I.D.....: Douglass Aircraft-Torrance

...TE SAMPLED...... 07/18/95
TIME SAMPLED...... 00:09
WORK DESCRIPTION.... D12

LABORATORY I.D...: 952275-0012 DATE RECEIVED...: 07/26/95 TIME RECEIVED....: 09:47

REMARKS..... Soil; Brass Sleeve

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECH
mication Extraction for PCBs	COMPLETED		N/A	EPA 3550	07/31/95	TH
		*1		EPA 8080	07/31/95	CIS
Polychlorinated Biphenyls			lum them	EPA 8080		
Aroclor-1016 Aroclor-1221	ND ND	33 33	ug/kg ug/kg	EPA 8080		
Aroctor-1221 Aroctor-1232	ND	33	lug/kg	EPA 8080 EPA 8080		
Aroclor-1242	ND ND	33 33	ug/kg ug/kg	EPA 8080		
Aroclor-1248 Aroclor-1254	ND ND	33	lug/kg	EPA 8080		
Araclar-1260	2200	33	ug/kg % Recovery	EPA 8080 QC LIMITS 40-130	,	
Tetrachloro-m-xylene (SURROGATE)	60	0	% Recovery			
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IENT I.D......: Douglass Aircraft-Torrance

...TE SAMPLED....: 07/18/95 TIME SAMPLED....: 00:09

WORK DESCRIPTION...: D13

## **CORE LABORATORIES**

RESULTS TESTS LABORATORY

08/02/95

CUSTOMER: Environmental Science & Engineerng JOB NUMBER: 952275

ATTN: David Ferreira

LABORATORY I.D...: 952275-0013 DATE RECEIVED...: 07/26/95

TIME RECEIVED...: 09:47
REMARKS..... Soil; Brass Sleeve

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
nication Extraction for PCBs	COMPLETED		N/A	EPA 3550	07/31/95	TH
	50111 22123	*1		EPA 8080	07/31/95	cis
Polychlorinated Biphenyls		33	ug/kg	EPA 8080		
Aroclor-1016 Aroclor-1221	ND ND	33	ug/kg	EPA 8080 EPA 8080		
Aroctor-1232	ND ND	33 33	ug/kg ug/kg	EPA 8080		
Aroclor-1242 Aroclor-1248	ND	33 33	ug/kg ug/kg	EPA 8080 EPA 8080		
Aroclor-1254 Aroclor-1260	ND ND	33	lug/kg	EPA 8080 QC LIMITS 40-130		
Tetrachloro-m-xylene (SURROGATE)	63	0	% Recovery	GC EIMIIS 40-150		
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LABORATORY

RESULTS

TESTS 08/02/95

JOB NUMBER: 952275

CUSTOMER: Environmental Science & Engineering

ATTN: David Ferreira

( LENT I.D...... Douglass Aircraft-Torrance

L...7E SAMPLED....: 07/18/95 TIME SAMPLED....: 00:09

WORK DESCRIPTION...: D14

LABORATORY I.D...: 952275-0014 DATE RECEIVED ....: 07/26/95

TIME RECEIVED...: 09:47
REMARKS.....: Soil; Brass Sleeve

	FINAL RESULT	I IMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
TEST DESCRIPTION			N/A	EPA 3550	07/31/95 .	TH
nication Extraction for PCBs	COMPLETED		<b>''</b> ,	EPA 8080	07/31/95	CIS
Polychlorinated Biphenyls		*1		1	' '	1
Aroclor-1016	ND	33 33	ug/kg ug/kg	EPA 8080 EPA 8080		
Aroclor-1221 Aroclor-1232	ND ND	33	lug/kg	EPA 8080 EPA 8080		
Aroclor-1242	ND	33 33	ug/kg ug/kg	EPA 8080		
Aroclor-1248 Aroclor-1254	ND ND	33	ug/kg	EPA 8080 EPA 8080		
Apoctor-1260	ND 62	33 0	ug/kg % Recovery	QC LIMITS 40-130		
Tetrachloro-m-xylene (SURROGATE)	<b>SL</b>					.
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LABORATORY

RESULTS TESTS

08/02/95

JOB NUMBER: 952275

CUSTOMER: Environmental Science & Engineerng

ATTN: David Ferreira

LABORATORY I.D...: 952275-0015

DATE RECEIVED...: 07/26/95

.IENT I.D....: Douglass Aircraft-Torrance
...TE SAMPLED....: 07/18/95
TIME SAMPLED...: 00:09
WORK DESCRIPTION..: D15

TIME RECEIVED...: 09:47
REMARKS..... Soil; Brass Sleeve

FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
COMPLETED		N/A	EPA 3550	07/31/95	TH
	*1		EPA 8080	07/31/95	CIS
ND ND ND ND ND 4700 66	33 33 33 33 33 33 33 0	ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg % Recovery	EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 QC LIMITS 40-130		
					:
	ND ND ND ND ND ND A700	COMPLETED *1  ND 33  ND 33  ND 33  ND 33  ND 33  ND 33  ND 33  ND 33  ND 33  ND 33  ND 33  ND 33  ND 33  ND 33	COMPLETED      N/A       *1     wg/kg       ND     33     ug/kg       4700     33     ug/kg	COMPLETED N/A EPA 3550  *1 EPA 8080  ND 33 Ug/kg EPA 8080  ND 33 Ug/kg EPA 8080  ND 33 Ug/kg EPA 8080  ND 33 Ug/kg EPA 8080  ND 33 Ug/kg EPA 8080  ND 33 Ug/kg EPA 8080  ND 33 Ug/kg EPA 8080  ND 33 Ug/kg EPA 8080  ND 33 Ug/kg EPA 8080  EPA 8080  EPA 8080  EPA 8080  EPA 8080  EPA 8080  EPA 8080  EPA 8080	COMPLETED N/A EPA 3550 07/31/95  *1 EPA 8080 07/31/95  ND 33 Ug/kg EPA 8080 ND 33 Ug/kg EPA 8080 ND 33 Ug/kg EPA 8080 ND 33 Ug/kg EPA 8080 ND 33 Ug/kg EPA 8080 ND 33 Ug/kg EPA 8080 ND 33 Ug/kg EPA 8080 ND 33 Ug/kg EPA 8080 ND 33 Ug/kg EPA 8080 ND 33 Ug/kg EPA 8080 ND 33 Ug/kg EPA 8080 ND 33 Ug/kg EPA 8080

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PAGE:15

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IENT I.D....: Douglass Aircraft-Torrance
TIME SAMPLED....: 07/18/95
TIME SAMPLED...: 00:09
WORK DESCRIPTION..: D16

## **CORE LABORATORIES**

LABORATORY

RESULTS TESTS

08/02/95

JOB NUMBER: 952275

CUSTOMER: Environmental Science & Engineering

ATTN: David Ferreira

LABORATORY I.D...: 952275-0016

DATE RECEIVED ...: 07/26/95

TIME RECEIVED ....: 09:47

REMARKS..... Soil; Brass Sleeve

COMPLETED  ND ND ND	*1 33 33	N/A ug/kg	EPA 3550 EPA 8080	07/31/95 07/31/95	TH CIS
ND	33	ua/ka		07/31/95	CIS
ND	33	ua/ka	1	í	
ND ND ND 9900 64	33 33 33 33 33 33 0	ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg % Recovery	EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 QC LIMITS 40-130		
		^			
_	ND 9900	ND 33 9900 33	ND 9900 33 ug/kg ug/kg	ND 33 ug/kg EPA 8080 EPA 8080 ug/kg ug/kg CO 1 MATE (0-130)	ND 33 ug/kg EPA 8080 P

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TESTS LABORATORY

RESULTS

08/02/95

JOB NUMBER: 952275

CUSTOMER: Environmental Science & Engineerng

ATTN: David Ferreira

IENT I.D.....: Douglass Aircraft-Torrance

TIME SAMPLED...... 07/18/95
TIME SAMPLED...... 00:09

LABORATORY I.D...: 952275-0017 DATE RECEIVED...: 07/26/95 TIME RECEIVED...: 09:47

REMARKS..... Soil; Brass Sleeve

Inication Extraction for PCBs COMPLETED N/A EPA 3550 07/31/95 TI		FZWAL DESINT	LIMITS/*DIFFITION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
#1 EPA 8080 07/31/95 C  #1 EPA 8080 07/31/95 C  #1 Aroclor=1016	TEST DESCRIPTION	FINAL RESULT		No. 2010 Committee Committ		07/31/95	TH
Polychlorinated Biphenyls	nication Extraction for PCBs	COMPLETED		IN/A			CIS
Aroclor-1016 Aroclor-1221 Aroclor-1232 Aroclor-1242 Aroclor-1248 Aroclor-1254 Aroclor-1254 Aroclor-1254 Aroclor-1260	Polychlorinated Biphenyls		*1			21/31/93	613
	Aroclor-1221 Aroclor-1232 Aroclor-1242 Aroclor-1248 Aroclor-1254	ND ND ND ND ND 1400	33 33 33 33 33 33 33	ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg	EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080		
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LABORATORY

RESULTS TESTS

08/02/95

JUB NUMBER: 952275

CUSTOMER: Environmental Science & Engineerng

ATTN: David Ferreira

IENT I.D....: Douglass Aircraft-Torrance
TE SAMPLED.....: 07/18/95

TIME SAMPLED....: 00:09
WORK DESCRIPTION...: D18

LABORATORY I.D...: 952275-0018 DATE RECEIVED...: 07/26/95

TIME RECEIVED...: 09:47
REMARKS....: Soil; Brass Sleeve

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
nication Extraction for PCBs	COMPLETED		N/A	EPA 3550	07/31/95	TH
Polychlorinated Biphenyls	1	*1		EPA 8080	07/31/95	CIS
Aroclor-1016 Aroclor-1221 Aroclor-1232 Aroclor-1242 Aroclor-1248 Aroclor-1254 Aroclor-1260 Tetrachloro-m-xylene (SURROGATE)	ND ND ND ND ND 10000 65	33 33 33 33 33 33 33 0	ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg % Recovery	EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 QC LIMITS 40-130		
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LABORATORY

TESTS 08/02/95

RESULTS

JOB NUMBER: 952275

CUSTOMER: Environmental Science & Engineering

ATTN: David Ferreira

LABORATORY I.D...: 952275-0019

.IENT I.D.....: Douglass Aircraft-Torrance

DATE RECEIVED....: 07/26/95

TE SAMPLED..... 07/18/95
TIME SAMPLED..... 00:09 WORK DESCRIPTION...: D19

TIME RECEIVED...: 09:47
REMARKS.....: Soil; Brass Sleeve

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN	
onication Extraction for PCBs	COMPLETED		N/A	EPA 3550	07/31/95	ТН	
Polychlorinated Biphenyls		*20		EPA 8080	08/01/95	CIS	
Aroclor-1016 Aroclor-1221 Aroclor-1232 Aroclor-1242 Aroclor-1248 Aroclor-1254 Aroclor-1260 Tetrachloro-m-xylene (SURROGATE)	ND ND ND ND ND ND 35000 58	660 660 660 660 660 660 660	ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg % Recovery	EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 QC LIMITS 40-130			
1250 Gene Autry Way Anaheim, CA 92805 (714) 937-1094							

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LABORATORY

RESULTS TESTS

08/02/95

JUB: NUMBER: 952275

CUSTOMER: Environmental Science & Engineering

ATTN: David Ferreira

LABORATORY I.D...: 952275-0020

IENT I.D....: Douglass Aircraft-Torrance
ITE SAMPLED...: 07/18/95
TIME SAMPLED...: 00:09
WORK DESCRIPTION..: D20

DATE RECEIVED...: 07/26/95 TIME RECEIVED...: 09:47

REMARKS.....: Soil; Brass Sleeve

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
nication Extraction for PCBs	COMPLETED		N/A	EPA 3550	07/31/95	тн
Polychlorinated Biphenyls		*1		EPA 8080	07/31/95	CIS
Aroclor-1016 Aroclor-1221 Aroclor-1232 Aroclor-1242 Aroclor-1248 Aroclor-1254 Aroclor-1260 Tetrachloro-m-xylene (SURROGATE)	ND ND ND ND ND ND ND ND	33 33 33 33 33 33 33 0	ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg % Recovery	EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 QC LIMITS 40-130		
			-			

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TESTS RESULTS LABORATORY

08/02/95

CUSTOMER: Environmental Science & Engineerng JB NUMBER: 952275

ATTN: David Ferreira

LABORATORY I.D...: 952275-0021 DATE RECEIVED....: 07/26/95

.IENT I.D....: Douglass Aircraft-Torrance
\text{TE SAMPLED.....: 07/18/95}
TIME SAMPLED....: 00:09
WORK DESCRIPTION...: D25-1 TIME RECEIVED...: 09:47 REMARKS..... Soil; Brass Sleeve

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
mication Extraction for PCBs	COMPLETED		N/A	EPA 3550	07/31/95	TH
Polychlorinated Biphenyls		*1		EPA 8080	07/31/95	CIS
Aroclor-1016 Aroclor-1221 Aroclor-1232 Aroclor-1242 Aroclor-1248 Aroclor-1254 Aroclor-1260 Tetrachloro-m-xylene (SURROGATE)	ND ND ND ND ND ND 16000	33 33 33 33 33 33 33 0	ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg % Recovery	EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 QC LIMITS 40-130		
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LABORATORY

RESULTS

TESTS 08/02/95

JOB NUMBER: 952275

CUSTOMER: Environmental Science & Engineerng

ATTN: David Ferreira

IENT I.D....: Douglass Aircraft-Torrance
LITE SAMPLED....: 07/18/95
TIME SAMPLED....: 00:09
WORK DESCRIPTION...: D25-8

DATE RECEIVED...: 07/26/95 TIME RECEIVED...: 09:47

LABORATORY I.D...: 952275-0022

REMARKS..... Soil; Brass Sleeve

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
onication Extraction for PCBs	COMPLETED		N/A	EPA 3550	07/31/95	тн
Polychlorinated Biphenyls		<b>*1</b>		EPA 8080	07/31/95	CIS
Aroclor-1016	ND ND	33 33	ug/kg ug/kg	EPA 8080 EPA 8080		
Aroctor-1221 Aroctor-1232	ND	33 33	ug/kg ug/kg	EPA 8080 EPA 8080		
Aroclor-1242 Aroclor-1248	ND ND	33	ug/kg	EPA 8080 EPA 8080		
Aroclor-1254 Aroclor-1260	ND 2200	33 33	ug/kg ug/kg	EPA 8080		
Tetrachloro-m-xylene (SURROGATE)	67	0	% Recovery	QC LIMITS 40-130		
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LABORATORY

RESULTS TESTS

08/02/95

JB NUMBER: 952275

CUSTOMER: Environmental Science & Engineering

ATTN: David Ferreira

LABORATORY I.D...: 952275-0023 DATE RECEIVED...: 07/26/95

LIENT I.D.....: Douglass Aircraft-Torrance
ATE SAMPLED....: 07/18/95
TIME SAMPLED....: 00:09

TIME RECEIVED ....: 09:47

WORK DESCRIPTION...: D25-13

REMARKS..... Soil; Brass Sleeve

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
onication Extraction for PCBs	COMPLETED		N/A	EPA 3550	07/31/95	TH
Polychlorinated Biphenyls		*1		EPA 8080	07/31/95	CIS
Aroclor-1016 Aroclor-1221 Aroclor-1232 Aroclor-1242 Aroclor-1248 Aroclor-1254 Aroclor-1250 Tetrachloro-m-xylene (SURROGATE)	ND ND ND ND ND 130 67	33 33 33 33 33 33 33 0	ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg % Recovery	EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 QC LIMITS 40-130		
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LABORATORY

TESTS RESULTS

08/02/95

JOB NUMBER: 952275

CUSTOMER: Environmental Science & Engineering

ATTN: David Ferreira

LIENT I.D..... Douglass Aircraft-Torrance

LABORATORY I.D...: 952275-0024 DATE RECEIVED ....: 07/26/95

ATE SAMPLED..... 07/18/95

TIME RECEIVED ...: 09:47

TIME SAMPLED.....: 00:09 WORK DESCRIPTION...: D26-2

REMARKS..... Soil; Brass Sleeve

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE TECHN
onication Extraction for PCBs	COMPLETED		N/A	EPA 3550	07/31/95 TH
Polychlorinated Biphenyls		*1		EPA 8080	07/31/95 CIS
Aroclor-1016 Aroclor-1221 Aroclor-1232 Aroclor-1242 Aroclor-1248 Aroclor-1254 Aroclor-1260 Tetrachloro-m-xylene (SURROGATE)	ND ND ND ND ND 2900 69	33 33 33 33 33 33 33 0	ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg % Recovery	EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 QC LIMITS 40-130	
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LIENT I.D..... Douglass Aircraft-Torrance

# **CORE LABORATORIES**

LABORATORY

RESULTS

TESTS 08/02/95

JOB NUMBER: 952275

ATE SAMPLED..... 07/18/95

TIME SAMPLED.....: 00:09

WORK DESCRIPTION ...: D26-7

CUSTOMER: Environmental Science & Engineerng

ATTN: David Ferreira

LABORATORY I.D...: 952275-0025

DATE RECEIVED...: 07/26/95

TIME RECEIVED....: 09:47

REMARKS..... Soil; Brass Sleeve

FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
COMPLETED		N/A	EPA 3550	07/31/95	ТН
	*1		EPA 8080	07/31/95	CIS
ND ND ND ND ND ND 680 66	33 33 33 33 33 33 33 0	ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg % Recovery	EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 QC LIMITS 40-130		
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	COMPLETED  ND ND ND ND ND ND ND ND ND ND ND ND N	*1  ND 33  ND 33  ND 33  ND 33  ND 33  ND 33  ND 33  ND 33  ND 33  ND 33  ND 33  ND 33  ND 33  ND 33  ND 33  ND 33  ND 33  ND 33  ND 33	COMPLETED          N/A           *1         ug/kg           ND         33         ug/kg           680         33         ug/kg	N/A   EPA 3550   EPA 8080   EPA	COMPLETED N/A EPA 3550 07/31/95  *1 EPA 8080 07/31/95  ND 33 Ug/kg EPA 8080 ND 33 Ug/kg EPA 8080 ND 33 Ug/kg EPA 8080 ND 33 Ug/kg EPA 8080 ND 33 Ug/kg EPA 8080 ND 33 Ug/kg EPA 8080 ND 33 Ug/kg EPA 8080 ND 33 Ug/kg EPA 8080 ND 33 Ug/kg EPA 8080 ND 33 Ug/kg EPA 8080 ND 33 Ug/kg EPA 8080 ND 33 Ug/kg EPA 8080 ND 33 Ug/kg EPA 8080 ND 33 Ug/kg EPA 8080 ND 33 Ug/kg EPA 8080 ND 33 Ug/kg EPA 8080 ND 33 Ug/kg EPA 8080 ND 33 Ug/kg EPA 8080

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LABORATORY TESTS

08/02/95

JOB NUMBER: 952275

CUSTOMER: Environmental Science & Engineerng

ATTN: David Ferreira

LABORATORY I.D...: 952275-0026

RESULTS

IENT I.D....: Douglass Aircraft-Torrance
...TE SAMPLED....: 07/18/95
TIME SAMPLED....: 00:09

DATE RECEIVED....: 07/26/95

WORK DESCRIPTION...: D26-13

TIME RECEIVED...: 09:47
REMARKS....: Soil; Brass Sleeve

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST: METHOD	DATE	TECHN
mication Extraction for PCBs	COMPLETED		N/A	EPA 3550	08/01/95	TH
		*1		EPA 8080	08/01/95	CIS
Polychlorinated Biphenyls		33	ug/kg	EPA 8080		
Aroctor-1016 Aroctor-1221	ND ND	33	ug/kg	EPA 8080		
Aroclor-1232	ND	33 33 33 33 33 33	ug/kg ug/kg	EPA 8080 EPA 8080		
Aroclor-1242	ND ND	33	ug/kg	EPA 8080		
Aroclor-1248 Aroclor-1254	ND	33	ug/kg	EPA 8080 EPA 8080		
Aroctor-1260	ND	33	ug/kg % Recovery	QC LIMITS 40-130		
Tetrachloro-m-xylene (SURROGATE)	68		/* Kedove. /			
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LABORATORY

RESULTS TESTS

08/02/95

JOB NUMBER: 952275

CUSTOMER: Environmental Science & Engineerng

ATTN: David Ferreira

IENT I.D.....: Douglass Aircraft-Torrance
\_\_TE SAMPLED....: 07/18/95
TIME SAMPLED....: 00:09

WORK DESCRIPTION...: D31-5

LABORATORY I.D...: 952275-0027

DATE RECEIVED ....: 07/26/95 TIME RECEIVED ....: 09:47

REMARKS..... Soil; Brass Sleeve

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
onication Extraction for PCBs	COMPLETED		N/A	EPA 3550	08/01/95	TH
Polychlorinated Biphenyls	•	*1	,	EPA 8080	08/01/95	CIS
Aroclor-1016 Aroclor-1221 Aroclor-1232 Aroclor-1242 Aroclor-1248 Aroclor-1254 Aroclor-1260 Tetrachloro-m-xylene (SURROGATE)	ND ND ND ND ND ND 4400 68	33 33 33 33 33 33 33 0	ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg % Recovery	EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 QC LIMITS 40-130		
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LABORATORY

RESULTS TESTS

08/02/95

JOB NUMBER: 952275

CUSTOMER: Environmental Science & Engineerng

ATTN: David Ferreira

LIENT I.D..... Douglass Aircraft-Torrance TIME SAMPLED....: 07/18/95
TIME SAMPLED....: 00:09
UORK DESCRIPTION...: D31-10

LABORATORY I.D...: 952275-0028 DATE RECEIVED....: 07/26/95

TIME RECEIVED...: 09:47
REMARKS..... Soil; Brass Sleeve

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
onication Extraction for PCBs	COMPLETED		N/A	EPA 3550	08/01/95	TH
Polychlorinated Biphenyls		*1		EPA 8080	08/01/95	CIS
Aroclor-1016 Aroclor-1221 Aroclor-1232 Aroclor-1242 Aroclor-1248 Aroclor-1254 Aroclor-1260 Tetrachloro-m-xylene (SURROGATE)	ND ND ND ND ND ND ND	33 33 33 33 33 33 33 0	ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg % Recovery	EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 QC LIMITS 40-130		
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	1	<u> </u>		250 Cone Autry Way		

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LABORATORY

RESULTS

TESTS 08/02/95

JOB NUMBER: 952275

CUSTOMER: Environmental Science & Engineerng

ATTN: David Ferreira

\_IENT I.D..... Douglass Aircraft-Torrance

LABORATORY I.D...: 952275-0029 DATE RECEIVED...: 07/26/95 TIME RECEIVED...: 09:47

TIME SAMPLED...... 07/18/95
TIME SAMPLED...... 00:09
WORK DESCRIPTION...: D31-15

REMARKS..... Soil; Brass Sleeve

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
onication Extraction for PCBs	COMPLETED	449, 447 mm 107 FE	N/A	EPA 3550	08/01/95	тн
Polychlorinated Biphenyls	·	*1		EPA 8080	08/01/95	CIS
Aroclor-1016 Aroclor-1221 Aroclor-1232 Aroclor-1242 Aroclor-1248 Aroclor-1254 Aroclor-1260 Tetrachloro-m-xylene (SURROGATE)	ND ND ND ND ND ND 560 67	33 33 33 33 33 33 33 0	ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg % Recovery	EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 QC LIMITS 40-130		
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ASSURANCE REPORT QUALITY

08/02/95

David Ferreira CUSTOMER: Environmental Science & Engineering ATTN: JOB NUMBER: 952275

38s by EPA 8080

DATE ANALYZED: 07/27/95 TIME ANALYZED: 00:00 METHOD: EPA 8080

QC NUMBER:944994

		BLAN	ı K S			
EST DESCRIPTION	ANALY SUB-TYPE	ANALYSIS I.D.	DILUTION FACTOR	ANALYZED VALUE	DETECTION LIMIT	UNITS OF MEASURE
Aroclor-1016 roclor-1221 roclor-1232 roclor-1242 Aroclor-1248 Aroclor-1254 roclor-1260 etrachloro-m-xylene (SURROGATE)	METHOD METHOD METHOD METHOD METHOD METHOD METHOD METHOD	072795 072795 072795 072795 072795 072795 072795 072795	1 1 1 1 1 1 1	<33 <33 <33 <33 <33 <33 <33 <56	33 33 33 33 33 33 33 0	ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg % Recovery
1						

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QUALITY ASSURANCE

08/02/95

REPORT

JOB NUMBER: 952275

CUSTOMER: Environmental Science & Engineerng

ATTN: David Ferreira

CBs by EPA 8080

DATE ANALYZED: 07/27/95 TIME ANALYZED: 00:00 METHOD: EPA 8080

QC NUMBER: 944994

<b> </b>			MATRIX	S P I K	E S				
EST  DESCRIPTION	ANALYSIS SUB-TYPE	ANALYSIS I. D.	DILUTION FACTOR	ANALYZED VALUE	ORIGINAL VALUE	SPIKE ADDED	PERCENT RECOVERY	DETECTION LIMITS	UNITS OF MEASURE
roclor-1254 .etrachloro-m-xylene (SURROGAT	BLANK BLANK DUP BLANK BLANK DUP	072195-0 072195-0 072195-0 072195-0	1 1 1 1	470 430 54 55	0 0 0 0	330 330 100 100	142 130 54 55	33 33 0 0	ug/kg ug/kg % Recovery % Recovery
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1250 Gene Autry Way Anaheim, CA 92805 (714) 937-1094

PAGE:31



A S S U R A N C E 08/02/95 REPORT QUALITY

CUSTOMER: Environmental Science & Engineerng JOB NUMBER: 952275

ATTN: David Ferreira

CBs by EPA 8080

DATE ANALYZED: 07/31/95 TIME ANALYZED: 00:00 METHOD: .PA 8080

QC NUMBER: 945097

SET DESCRIPTION	ANALY	SUB-TYPE	BLAN ANALYSIS I.D.	DILUTION FACTOR	ANALYZED VALUE	DETECTION LIMIT	UNITS OF MEASURE
EST DESCRIPTION  Aroclor-1016    roclor-1221    roclor-1232    roclor-1242 Aroclor-1248 Aroclor-1254    roclor-1260    etrachloro-m-xylene (SURROGATE)	METHOD METHOD METHOD METHOD METHOD METHOD METHOD METHOD		073195 073195 073195 073195 073195 073195 073195 073195 073195	1 1 1 1 1 1 1		33 33 33 33 33 33 33 0	ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg % Recovery

1250 Gene Autry Way Anaheim, CA 92805 (714) 937-1094

PAGE:32



ASSURANCE QUALITY

08/02/95

ATTN: David Ferreira CUSTOMER: Environmental Science & Engineering JOB NUMBER: 952275

CBs by EPA 8080

DATE ANALYZED: 07/31/95 TIME ANALYZED: 00:00 METHOD: .PA 8080

QC NUMBER: 945097

			MATRIX	S P I K	ES				
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roclor-1254	MATRIX MATRIX DUP	9522 <b>7</b> 5-9 952275-9	1	450 410	0	330 330 100	136 124 68	33 33 0	ug/kg ug/kg % Recovery % Recovery
etrachloro-m-xylene (SURROGAT	MATRIX MATRIX DUP	952275-9 952275-9	1 1	68 68	0	100	68	Ö	% Recovery
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1250 Gene Autry Way Anaheim, CA 92805 (714) 937-1094

PAGE:33



ASSURANCE REPORT QUALITY

08/02/95

ATTN: David Ferreira CUSTOMER: Environmental Science & Engineerng JOB NUMBER: 952275

CBs by EPA 8080

DATE ANALYZED: 08/01/95 TIME ANALYZED: 00:00 METHOD: EPA 8080

QC NUMBER: 945099

		BLAN	K S			
EST DESCRIPTION	ANALY SUB-TYPE	ANALYSIS I.D.	DILUTION FACTOR	ANALYZED VALUE	DETECTION LIMIT	UNITS OF MEASURE
Aroclor-1016 ^roclor-1221 _roclor-1232 _roclor-1242 Aroclor-1248 Aroclor-1254 _roclor-1260 'etrachloro-m-xylene (SURROGATE)	METHOD METHOD METHOD METHOD METHOD METHOD METHOD METHOD	080195 080195 080195 080195 080195 080195 080195 080195	1 1 1 1 1 1	<33 <33 <33 <33 <33 <33 <66	33 33 33 33 33 33 33 0	ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg % Recovery

1250 Gene Autry Way Anaheim, CA 92805 (714) 937-1094

PAGE:34



ASSURANCE REPORT QUALITY

08/02/95

ATTN: David Ferreira CUSTOMER: Environmental Science & Engineerng JOB NUMBER: 952275

CBs by EPA 8080

DATE ANALYZED: 08/01/95 TIME ANALYZED: 00:00 METHOD: EPA 8080

QC NUMBER: 945099

			MATRIX	SPIK	E S				
EST UESCRIPTION	ANALYSIS SUB-TYPE	ANALYSIS I. D.	DILUTION FACTOR	ANALYZED VALUE	ORIGINAL VALUE	SPIKE ADDED	PERCENT RECOVERY		MEASURE
\roclor-1254 `etrachloro-m-xylene (SURROGAT	MATRIX MATRIX DUP MATRIX MATRIX DUP	952275-9	1 1 1 1	450 410 68 68	0 0 0 0	330 330 100 100	136 124 68 68	33 33 0 0	ug/kg ug/kg % Recovery % Recovery
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1250 Gene Autry Way Anaheim, CA 92805 (714) 937-1094

PAGE:35



#### QUALITY ASSURANCE FOOTER

#### METHOD REFERENCES

- (1) EPA SW-846, Test Methods for Evaluating Solid Waste, Third Edition, November 1990, and July 1992 update
- (2) Standard Methods for the Examination of Water and Wastewater, 17th Edition, 1989
- (3) EPA 600/4-79-020, Methods of Chemical Analysis for Waters and Wastes, March 1983

(4) Federal Register, Friday, October 26, 1984 (40 CFR Part 136) (5) American Society for Testing and Materials, Volumes 5.01, 5.02, 5.03, 1992

- (6) EPA 600/4-89-001, Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Fresh Water Organisms
- (7) EPA 600/4-90-027, Methods for Measuring the Acute Toxicity of Effluent and Receiving Waters to Fresh Water and Marine Organisms, Fourth Edition

#### COMMENTS

All methods of chemical analysis have a statistical uncertainty associated with the results. Unless otherwise indicated, the data in this report are within the limits of uncertainty as specified in the referenced method. Quality control acceptance criteria are based either on actual laboratory performance or on limits specified in the referenced method. The date and time of analysis indicated on the QA report may not reflect the actual time of analysis for QC samples. All data reported on an "as received" basis unless otherwise indicated. Data reported in the QA report may be lower than sample data due to dilution of samples into the calibration range of the analysis. Sample concentrations for solid samples are calculated on an as received (wet) basis. Unless otherwise indicated, volatiles by gas chromatograpy are reported from a single column. Volatiles analyses on low level soils are conducted at room temperature.

#### FLAGS, FOOTNOTES, AND ABBREVIATIONS (as needed)

N.I. = Not Ignitable NA = Not analyzed S.I. = Sustains Ignition

= Not applicable N/A I(NS) = Ignites, but does not Sustain Ignition ug/L = Micrograms per liter

RPD = Relative Percent Difference mg/L = Milligrams per liter

= Not detected at a value greater than the reporting limit ND = Not calculable due to values lower than the detection limit

= Surrogate recoveries were outside acceptable ranges due to matrix effects. (a)

= Surrogate recoveries were not calculated due to dilution of the sample below the detectable range for the surrogate. (b)

= Matrix spike recoveries were outside acceptable ranges due to matrix effects. (c)

= Relative Percent Difference (RPD) for duplicate analysis outside acceptance limits due to actual differences in (d) the sample matrix.

= The limit listed for flammability indicates the upper limit for the test. Samples are not tested at temperatures above 140 Fahrenheit since only samples which will sustain ignition at temperatures below 140 are considered flammable.

= Results for this hydrocarbon range did not match a typical hydrocarbon pattern. Results were quantified using a (f) diesel standard, however, the hydrocarbon pattern did not match a diesel pattern.

= Results for this hydrocarbon range did not match a typical hydrocarbon pattern. Results were quantified using a gasoline standard, however, the hydrocarbon pattern did not match a gasoline pattern.

= High dilution due to matrix effects (h)

= Samples with results below 500 mg/L are considered hazardous

#### OC SAMPLE IDENTIFICATIONS

SB = Storage Blank MR = Method Blank . MS = Matrix Spike RB = Reagent Blank MSD = Matrix Spike Duplicate ICB = Initial Calibration Blank MD = Matrix Duplicate CCB = Continuing Calibration Blank BS = Blank Spike CS = Calibration Standard SS = Surrogate Spike ICB = Initial Calibration LCS = Laboratory Control Verification

CCV = Continuing Calibration Standard RS = Reference Standard Verification

#### SUBCONTRACTED LABORATORY LOCATIONS

Core Laboratories: Aurora, Colorado(ELAP #1933) \*AU Casper, Wyoming Corpus Christi, Texas \*CA

\*CC Houston, Texas \*HP Lake Charles, Louisiana \*LC \*! R Long Beach, California

Aquatic Testing Laboratories:

Ventura, California

1250 Gene Autry Way Anaheim, CA 92805 (714) 937-1094

Rev. 23 /usr/nick/wpwork/qafooter23 8/12/94

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\*AT



452275

# FACSIMILE DATE: TIME: David Ferreira FROM: TO: ESE 17390 Brookhurst St., 110 Fountain Valley, CA 92708 FAX #: JOB #: Douglass Aircraft SUBJECT: Number of Pages (Including this Cover Sheet) **ADDITIONAL MESSAGE:** analyze the following composites on PCB's Sday t.A.T If you have any questions, please call us immediately at (714) 964-8722.

BOE-C6-0220817

Fax (714) 962-3383

Phone (714) 964-8722

Fountain Valley, CA 92708

17390 Brookhurst, Suite 110

17390 BROOKHURST STREET

# CHAIN-OF-CUSTODY RECORD

DATE 7/18 PAGE 1 OF 6 ENVIRONMENTAL SUITE 110 FOUNTAIN VALLEY, CA 92708 PHONE: (714) 964-8722 SCIENCE & FAX: (714) 962-3383 CONTAINERS ENGIRZERING, INC. ANALYSES TO BE PERFORMED Douglass Alreraft - Torrance-REMARKS (MATRIX, CONTAINER, 3 SIZE, ETC.) 6495203 <u>a</u> 9 ECT NO. Š Pces Soll, Tube LOCATION TIME DATE JAMPLE ID Former Transform 7/18/C -Comp 1410 TURN AROUND TIME DATE (PRINT) RECEIVED BY 24 Hr.\_\_\_\_5 DAY\_X RELINQUISHED BY (PRINT) DATE (PRINT) DATE RELINQUISHED BY (PRINT) DATE RECEIVED BY 2-DAY \_\_\_\_REGULAR\_ 1 Ferceira 7/9/8 SIGNATURE SIGNATURE SIGNATURE SHIPMENT REQUIREMENTS TIME TIME COMPANY NAME SIGNATURE TIME COMPANY NAME SAMPLE RECEIPT COMPANY, NAME TOTAL NO. OF CONTAINERS BOE-C6-0220818 COMPANY NAME PORE PECIAL INSTRUCTIONS (HANDLING, ANALYSES, DETECTION LIMIT, STORAGE, ETC.) CHAIN OF CUSTODY SEALS REC'D GOOD CONDIN/COLD CONFORMS TO RECORD Composite 10:1



BOE-C6-0220819

ENVIRONMENTAL SCIENCE & ENGINEERING, INC. 17390 BROOKHURST STREET SUITE 110 FOUNTAIN VALLEY, CA 92708 PHONE: (714) 964-8722 FAX: (714) 962-3383

# CHAIN-OF-CUSTODY RECORD

DATE 7/13 PAGE 7-0F6

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OJECT NAME Douglass A	ircraft					ANAI	YSES	TO I	BE PER	RF	ORMED							RS	
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ENVIRONMENTAL SCIENCE & ENGINEERING, INC. 17390 BROOKHURST STREET SUITE 110 FOUNTAIN VALLEY, CA 92708 PHONE: (714) 964-8722 FAX: (714) 962-3383

# CHAIN-OF-CUSTODY RECORD

DATE 7/13 PAGE 3 OF 6

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ENVIRONMENTAL SCIENCE & ENGINEERING, INC. 17390 BROOKHURST STREET SUITE 110 FOUNTAIN VALLEY, CA 92708 PHONE: (714) 964-8722 FAX: (714) 962-3383

# CHAIN-OF-CUSTODY RECORD

DATE 7/13 PAGE 4 OF 6

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ENVIRONMENTAL SCIENCE & ENGINEERING, INC.

17390 BROOKHURST STREET SUITE 110 FOUNTAIN VALLEY, CA 92708 PHONE: (714) 964-8722 FAX: (714) 962-3383

# CHAIN-OF-CUSTODY RECORD

CHAIN OF CUSTODY SEALS

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ENVIRONMENTAL SCIENCE & ENGINEERING, INC.

'ROJECT NO. 6495 203

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17390 BROOKHURST STREET SUITE 110 FOUNTAIN VALLEY, CA 92708

# CHAIN-OF-CUSTODY RECORD

PHONE: (714) 964-8722 FAX: (714) 962-3383 DATE 7/18 PAGE 6 OF 6 PROJECT NAME Douglass Aircraft - Tormies ANALYSES TO BE PERFORMED (ශිරහි) REMARKS (MATRIX, CONTAINER. SIZE, ETC.) LOCATION Х Area Soil, Tube RELINQUISHED BY (PRINT) DATE RECEIVED BY DATE RELINQUISHED BY (PRINT) DATE RECEIVED BY TURN AROUND TIME **SIGNATURE** SIGNATURE Eles Segure TIME 3 DAY 1 REGULAR TIME TIME COMPANY NAME COMPANY NAME COMPANY NAME SHIPMENT REQUIREMENTS CORE SPECIAL INSTRUCTIONS (HANDLING, ANALYSES, DETECTION LIMIT, STORAGE, ETC.) SAMPLE RECEIPT TOTAL NO. OF CONTAINERS CHAIN OF CUSTODY SEALS

3001

NDTI



CORE LABORATORIES
ANALYTICAL REPORT

Job Number: 952576 Prepared For:

Environmental Science & Engineerng David Ferreira 17390 Brookhurst Street Fountain Valley, CA 92708

Date: 08/30/95

Signature

15. Word for 8/

Name: Timothy A. Scott

Core Laboratories 1250 Gene Autry Way Anaheim, CA 92805

Title: Laboratory Manager

C A. E. L. A. P. 1174 L. A. C. S. D. 10146



CLIENT I.D..... McDonnell Douglas 64-95203

### **CORE LABORATORIES**

LABORATORY

TESTS 08/30/95

RESULTS

JOB NUMBER: 952576

DATE SAMPLED....: 08/24/95 TIME SAMPLED....: 11:25

WORK DESCRIPTION...: MD-1

CUSTOMER:

Environmental Science & Engineerng

ATTN: David Ferreira .

LABORATORY I.D...: 952576-0001

DATE RECEIVED ....: 08/25/95 TIME RECEIVED ....: 09:40

REMARKS.....: Soil;1-Brass Sleeve

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECH
Sonication Extraction for PCBs	COMPLETED		N/A	EPA 3550	08/29/95	TH
Polychlorinated Biphenyls		*1		EPA 8080	08/29/95	cis
Aroclor-1016 Aroclor-1221 Aroclor-1232 Aroclor-1242 Aroclor-1248 Aroclor-1254 Aroclor-1260 Tetrachloro-m-xylene (SURROGATE)	ND ND ND ND ND ND ND	33 33 33 33 33 33 33 33 0	ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg % Recovery	EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 QC LIMITS 40-130		

1250 Gene Autry Way Anaheim, CA 92805 (714) 937-1094

PAGE:1



RESULTS LABORATORY TESTS

08/30/95

ATTN: David Ferreira CUSTOMER: Environmental Science & Engineering JOB NUMBER: 952576

CLIENT I.D.....: McDonnell Douglas 64-95203 DATE SAMPLED.....: 08/24/95

TIME SAMPLED.....: 11:35 WORK DESCRIPTION...: MD-2

LABORATORY I.D...: 952576-0002 DATE RECEIVED....: 08/25/95

TIME RECEIVED...: 09:40
REMARKS.....: Soil;1-Brass Sleeve

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Sonication Extraction for PCBs	COMPLETED		N/A	EPA 3550	08/29/95	TH
Polychlorinated Biphenyls		*1		EPA 8080	08/29/95	CIS
Polychlorinated Biphenyls  Aroclor-1016 Aroclor-1232 Aroclor-1242 Aroclor-1254 Aroclor-1254 Aroclor-160 Tetrachloro-m-xylene (SURROGATE)	ND ND ND ND ND S6	*1 33 33 33 33 33 33 0	ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg % Recovery	EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 CEPA 8080 EPA 8080 EPA 8080 CEPA 8080 CEPA 8080	08/29/95	CIS

1250 Gene Autry Way Anaheim, CA 92805 (714) 937-1094

#### PAGE:2



TESTS RESULTS LABORATORY

08/30/95

ATTN: David Ferreira CUSTOMER: Environmental Science & Engineering JOB NUMBER: 952576

LABORATORY I.D...: 952576-0003

CLIENT I.D..... McDonnell Douglas 64-95203 DATE SAMPLED....: 08/24/95
TIME SAMPLED....: 11:55 DATE RECEIVED....: 08/25/95 TIME RECEIVED...: 09:40

REMARKS..... Soil;1-Brass Sleeve WORK DESCRIPTION...: MD-3

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Sonication Extraction for PCBs	COMPLETED		N/A	EPA 3550	08/29/95	TH
Polychlorinated Biphenyls		*1		EPA 8080	08/29/95	CIS
Aroclor-1016	ND	33	ug/kg	EPA 8080		
Aroclor-1221	ND	33 33 33	lug/kg	EPA 8080		
Aroclor-1232	ND	33	ug/kg ug/kg	EPA 8080 EPA 8080		
Aroclor-1242	ND	33	lug/kg	EPA 8080		
Aroclor-1248	ND ND	33	ug/kg ug/kg	EPA 8080	1	
Aroclor-1254 Aroclor-1260	ND	33	ug/kg	EPA 8080	1	
Tetrachloro-m-xylene (SURROGATE)	54	0	% Recovery	QC LIMITS 40-130	1	
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#### PAGE:3



LABORATORY

TESTS

RESULTS

08/30/95

JOB NUMBER: 952576

CUSTOMER: Environmental Science & Engineering

ATTN: David Ferreira

LABORATORY I.D...: 952576-0004

CLIENT I.D..... McDonnell Douglas 64-95203

DATE RECEIVED....: 08/25/95

DATE SAMPLED....: 08/24/95 TIME SAMPLED....: 12:10

WORK DESCRIPTION...: MD-4

TIME RECEIVED...: 09:40 REMARKS..... Soil;1-Brass Sleeve

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHI
Sonication Extraction for PCBs	COMPLETED		N/A	EPA 3550	08/29/95	TH
Polychlorinated Biphenyls		*1		EPA 8080	08/29/95	CIS
Polychlorinated Biphenyls  Aroclor-1016 Aroclor-1221 Aroclor-1232 Aroclor-1242 Aroclor-1248 Aroclor-1254 Aroclor-1260 Tetrachloro-m-xylene (SURROGATE)	ND ND ND ND ND ND S6	*1 33 33 33 33 33 33 0	ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg % Recovery	EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 CPA 8080 CPA 8080 CPA 8080	08/29/95	CIS

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PAGE:4



LABORATORY

TESTS

08/30/95

RESULTS

JOB NUMBER: 952576

CUSTOMER: Environmental Science & Engineering

ATTN: David Ferreira

LABORATORY I.D...: 952576-0005

DATE SAMPLED....: 08/24/95 TIME SAMPLED....: 12:20 WORK DESCRIPTION...: MD-5

CLIENT I.D......: McDonnell Douglas 64-95203

DATE RECEIVED...: 08/25/95
TIME RECEIVED...: 09:40
REMARKS....: Soil;1-Brass Sleeve

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Sonication Extraction for PCBs	COMPLETEDE		N/A	EPA 3550	08/29/95	TH
Polychlorinated Biphenyls		*1		EPA 8080	08/29/95	CIS
Aroclor-1016 Aroclor-1221 Aroclor-1232 Aroclor-1242 Aroclor-1248 Aroclor-1254 Aroclor-1260 Tetrachloro-m-xylene (SURROGATE)	ND ND ND ND ND ND ND	33. 33. 33. 33. 33. 33. 33. 0	ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg	EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 QC LIMITS 40-130		

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TESTS RESULTS LABORATORY

08/30/95

ATTN: David Ferreira CUSTOMER: Environmental Science & Engineerng JOB NUMBER: 952576

CLIENT I.D.....: McDonnell Douglas 64-95203 DATE SAMPLED.....: 08/24/95

TIME SAMPLED..... 12:30
WORK DESCRIPTION...: MD-6

LABORATORY I.D...: 952576-0006 DATE RECEIVED...: 08/25/95 TIME RECEIVED...: 09:40

REMARKS..... Soil;1-Brass Sleeve

		l			DATE	TECHN
TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD		(8880)
Sonication Extraction for PCBs	COMPLETED		N/A	EPA 3550	08/29/95	TH
Polychlorinated Biphenyls		*1		EPA 8080	08/29/95	CIS
			,,	EPA 8080		
Aroclor-1016	ND ND	33 33	ug/kg ug/kg	EPA 8080		
Aroclor-1221 Aroclor-1232	ND	33	lug/kg	EPA 8080	ŀ	
Aroclor-1242	ND	33 33	ug/kg	EPA 8080	1	
Aroclor-1248	ND	33 33	ug/kg ug/kg	EPA 8080 EPA 8080		
Aroclor-1254 Aroclor-1260	ND ND	33	ug/kg	EPA 8080	]	
Tetrachloro-m-xylene (SURROGATE)	57	0	% Recovery	QC LIMITS 40-130	1	
Total delice of the Ny terior (common to						
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QUALITY ASSURANCE REPORT 08/30/95

ATTN: David Ferreira CUSTOMER: Environmental Science & Engineerng JOB NUMBER: 952576

OC NUMBER-0/5630

		BLA	N K S			
TEST DESCRIPTION	ANALY SUB-T	YPE ANALYSIS I.D.	DILUTION FACTOR	ANALYZED VALUE	DETECTION LIMIT	UNITS OF MEASUR
Aroclor-1016 Aroclor-1221 Aroclor-1232 Aroclor-1242 Aroclor-1248 Aroclor-1254 Aroclor-1260 Tetrachloro-m-xylene (SURROGATE)	METHOD METHOD METHOD METHOD METHOD METHOD METHOD METHOD	082995 082995 082995 082995 082995 082995 082995 082995	1 1 1 1 1 1 1 1 1	<33 <33 <33 <33 <33 <33 <35 <56	33 33 33 33 33 33 33 0	ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg xg/kg xg/kg

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QUALITY ASSURANCE 08/30/95 REPORT

ATTN: David Ferreira JOB NUMBER: 952576 CUSTOMER: Environmental Science & Engineerng

PCBs by EPA 8080

DATE ANALYZED: 08/29/95 TIME ANALYZED: 00:00 METHOD: EPA 8080

QC NUMBER: 945639

			MATRIX	SPIK	E S				
TEST DESCRIPTION	ANALYSIS SUB-TYPE	ANALYSIS I. D.	DILUTION FACTOR	ANALYZED VALUE	ORIGINAL VALUE	SPIKE ADDED	PERCENT RECOVERY	DETECTION LIMITS	UNITS OF MEASURE
Aroclor-1254 Tetrachloro-m-xylene (SURROGAT	MATRIX MATRIX DUP MATRIX MATRIX DUP	952476-8	1 1 1 1	480 430 53 49	0 0 0 0	330 330 100 100	145 130 53 49	33 33 0 0	ug/kg ug/kg % Recovery % Recovery

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#### QUALITY ASSURANCE FOOTER

#### METHOD REFERENCES

- (1) EPA SW-846, Test Methods for Evaluating Solid Waste, Third Edition, November 1990, and July 1992 update
- (2) Standard Methods for the Examination of Water and Wastewater, 17th Edition, 1989
- (3) EPA 600/4-79-020, Methods of Chemical Analysis for Waters and Wastes, March 1983
- (4) Federal Register, Friday, October 26, 1984 (40 CFR Part 136)
- (5) American Society for Testing and Materials, Volumes 5.01, 5.02, 5.03, 1992(6) EPA 600/4-89-001, Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Fresh Water Organisms
- (7) EPA 600/4-90-027, Methods for Measuring the Acute Toxicity of Effluent and Receiving Waters to Fresh Water and Marine Organisms, Fourth Edition

#### COMMENTS

All methods of chemical analysis have a statistical uncertainty associated with the results. Unless otherwise indicated, the data in this report are within the limits of uncertainty as specified in the referenced method. Quality control acceptance criteria are based either on actual laboratory performance or on limits specified in the referenced method. The date and time of analysis indicated on the QA report may not reflect the actual time of analysis for QC samples. All data reported on an "as received" basis unless otherwise indicated. Data reported in the QA report may be lower than sample data due to dilution of samples into the calibration range of the analysis. Sample concentrations for solid samples are calculated on an as received (wet) basis. Unless otherwise indicated, volatiles by gas chromatograpy are reported from a single column. Volatiles analyses on low level soils are conducted at room temperature.

#### FLAGS, FOOTNOTES, AND ABBREVIATIONS (as needed)

N.I. = Not Ignitable = Not analyzed N/A = Not applicable S.I. = Sustains Ignition

ug/L = Micrograms per liter I(NS) = Ignites, but does not Sustain Ignition

mg/L = Milligrams per liter RPD = Relative Percent Difference

ND = Not detected at a value greater than the reporting limit NC

= Not calculable due to values lower than the detection limit

(a) = Surrogate recoveries were outside acceptable ranges due to matrix effects.

= Surrogate recoveries were not calculated due to dilution of the sample below the detectable range for the surrogate. (b)

(c) = Matrix spike recoveries were outside acceptable ranges due to matrix effects. (d)

= Relative Percent Difference (RPD) for duplicate analysis outside acceptance limits due to actual differences in the sample matrix. = The limit listed for flammability indicates the upper limit for the test. Samples are not tested at temperatures

above 140 Fahrenheit since only samples which will sustain ignition at temperatures below 140 are considered

(f) = Results for this hydrocarbon range did not match a typical hydrocarbon pattern. Results were quantified using a diesel standard, however, the hydrocarbon pattern did not match a diesel pattern.

= Results for this hydrocarbon range did not match a typical hydrocarbon pattern. Results were quantified using a gasoline standard, however, the hydrocarbon pattern did not match a gasoline pattern.

= High dilution due to matrix effects (h)

(i) = Samples with results below 500 mg/L are considered hazardous

#### QC SAMPLE IDENTIFICATIONS

MB = Method Blank RB = Reagent Blank ICB = Initial Calibration Blank CCB = Continuing Calibration Blank CS = Calibration Standard ICB = Initial Calibration

Verification CCV = Continuing Calibration Verification

SB = Storage Blank MS = Matrix Spike

MSD = Matrix Spike Duplicate MD = Matrix Duplicate BS = Blank Spike SS = Surrogate Spike

LCS = Laboratory Control Standard RS = Reference Standard

#### SUBCONTRACTED LABORATORY LOCATIONS

Core Laboratories: Aurora, Colorado(ELAP #1933) \*AU Casper, Wyoming \*CA Corpus Christi, Texas \*CC \*HP Houston, Texas

Lake Charles, Louisiana \*LC Long Beach, California \*LB

Aquatic Testing Laboratories:

Ventura, California \*AT

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Rev. 23 /usr/nick/wpwork/qafooter23 8/12/94



BOE-C6-0220834

ENVIRONMENTAL SCIENCE & ENGINEERING, INC.

17390 BROOKHURST STREET SUITE 110 FOUNTAIN VALLEY, CA 92708 PHONE: (714) 964-8722 FAX: (714) 962-3383

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MD - 3		1155		X																		
MD 4		1210		X																		
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		.4.																			CONF	ORMS TO RECORD

## APPENDIX C

LABORATORY REPORTS AND CHAIN-OF-CUSTODY DOCUMENTS FOR SOIL SAMPLES COLLECTED DURING THE SUBSEQUENT GRID SAMPLING



CORE LABORATORIES
ANALYTICAL REPORT

Job Number: 952701 Prepared For:

Environmental Science & Engineerng David Ferreira 17390 Brookhurst Street Fountain Valley, CA 92708

Date: 10/27/95

# **REVISED REPORT**

Signature (

Date:

Name: Timothy A. Scott

Core Laboratories 1250 Gene Autry Way Anaheim, CA 92805

Title: LABORATORY MANAGER

C A. E. L. A. P. 1174 L A. C. S. D. 10146



RESULTS TESTS LABORATORY

10/27/95

David Ferreira CUSTOMER: Environmental Science & Engineerng ATTN: JOB NUMBER: 952701

CLIENT I.D..... DAC-Torrance/6495203

DATE SAMPLED....: 09/06/95 TIME SAMPLED....: 00:00

MORK DESCRIPTION...: Composite of 26-1 Thru 29-12

LABORATORY I.D...: 952701-0053 DATE RECEIVED....: 09/08/95 TIME RECEIVED...: 07:30

REMARKS..... Soil; Brass Sleeve

EST DESCRIPTION	FINAL RESULT	DETECTION LIMIT	UNITS OF MEASURE		DATE TECHN	
Conication Extraction for PCBs	COMPLETED		N/A	EPA 3550	09/14/95 TI	H
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LABORATORY

RESULTS TESTS

10/27/95

JOB NUMBER: 952701

CUSTOMER: Environmental Science & Engineerng

ATTN: David Ferreira

LIENT I.D..... DAC-Torrance/6495203

LABORATORY I.D...: 952701-0019

ATE SAMPLED.....: 09/06/95

DATE RECEIVED...: 09/08/95 TIME RECEIVED...: 07:30

TIME SAMPLED....: 00:00 WORK DESCRIPTION...: #19

REMARKS..... Soil; Brass Sleeve

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE TE	CHN
onication Extraction for PCBs	COMPLETED		N/A	EPA 3550	09/11/95 T	rH
Polychlorinated Biphenyls		*1		EPA 8080	09/11/95 0	:18
Aroclor-1016 Aroclor-1221 Aroclor-1232 Aroclor-1242 Aroclor-1248 Aroclor-1254 Aroclor-1260 Tetrachloro-m-xylene (SURROGATE)	ND ND ND ND ND ND 4100 48	33 33 33 33 33 33 33 0	ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg % Recovery	EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 QC LIMITS 40-130		
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PAGE:1



LABORATORY

CUSTOMER: Environmental Science & Engineering

TESTS

RESULTS

ATTN:

10/27/95

:LIENT I.D.....: DAC-Torrance/6495203

JATE SAMPLED...... 09/06/95
TIME SAMPLED...... 00:00
WORK DESCRIPTION...: #20

JOB NUMBER: 952701

LABORATORY I.D...: 952701-0020 DATE RECEIVED...: 09/08/95

David Ferreira

TIME RECEIVED...: 07:30

REMARKS..... Soil; Brass Sleeve

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Conication Extraction for PCBs	COMPLETED		N/A	EPA 3550	09/11/95	TH
Polychlorinated Biphenyls		*1		EPA 8080	09/11/95	CIS
Aroclor-1016 Aroclor-1221 Aroclor-1232 Aroclor-1242 Aroclor-1248 Aroclor-1254 Aroclor-1260 Tetrachloro-m-xylene (SURROGATE)	ND ND ND ND ND ND ND ND	33 33 33 33 33 33 33 0	ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg g Recovery	EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 QC LIMITS 40-130		
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PAGE:2



LABORATORY

RESULTS TESTS

10/27/95

JOB NUMBER: 952701

CUSTOMER: Environmental Science & Engineering

ATTN: David Ferreira

LIENT I.D..... DAC-Torrance/6495203

DATE RECEIVED...: 09/08/95

LABORATORY I.D...: 952701-0049

TIME RECEIVED...: 07:30

REMARKS..... Soil; Brass Sleeve

ATE SAMPLED....: 09/06/95 TIME SAMPLED...: 00:00 WORK DESCRIPTION...: Composite of #1-10

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
onication Extraction for PCBs	COMPLETED		N/A	EPA 3550	09/13/95	TH
Polychlorinated Biphenyls		*1		EPA 8080	09/11/95	CIS
Aroclor-1016 Aroclor-1221 Aroclor-1232 Aroclor-1242 Aroclor-1248 Aroclor-1254 Aroclor-1260 Tetrachloro-m-xylene (SURROGATE)	ND ND ND ND ND ND 120 51	33 33 33 33 33 33 33 0	ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg % Recovery	EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 QC LIMITS 40-130		
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LABORATORY

TESTS

RESULTS

10/27/95

JOB NUMBER: 952701

CUSTOMER: Environmental Science & Engineerng

ATTN: David Ferreira

LABORATORY I.D...: 952701-0050

DATE RECEIVED ....: 09/08/95

TIME RECEIVED....: 07:30

TIME SAMPLED.....: 00:00

ATE SAMPLED.....: 09/06/95

LIENT 1.D..... DAC-Torrance/6495203

WORK DESCRIPTION...: Composite of #11-18

REMARKS..... Soil; Brass Sleeve

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
onication Extraction for PCBs	COMPLETED		N/A	EPA 3550	09/11/95	TH
Polychlorinated Biphenyls		*1		EPA 8080	09/11/95	CIS
Aroclor-1016 Aroclor-1221 Aroclor-1232 Aroclor-1242 Aroclor-1248 Aroclor-1254 Aroclor-1260 Tetrachloro-m-xylene (SURROGATE)	ND ND ND ND ND 1700 48	33 33 33 33 33 33 33 0	ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg % Recovery	EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 QC LIMITS 40-130		
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PAGE:4



LABORATORY

RESULTS TESTS

10/27/95

IJOB NUMBER: 952701

CUSTOMER: Environmental Science & Engineerng

ATTN: David Ferreira

:LIENT I.D..... DAC-Torrance/6495203

ATE SAMPLED.....: 09/06/95

TIME SAMPLED.....: 00:00

WORK DESCRIPTION...: Composite of #21-33

LABORATORY I.D...: 952701-0051

DATE RECEIVED....: 09/08/95

TIME RECEIVED ...: 07:30

REMARKS..... Soil; Brass Sleeve

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD		TECHN
onication Extraction for PCBs	COMPLETED		N/A	EPA 3550	09/13/95	TH
Polychlorinated Biphenyls		*1		EPA 8080	09/11/95	CIS
Aroclor-1016 Aroclor-1221 Aroclor-1232 Aroclor-1242 Aroclor-1248 Aroclor-1254 Aroclor-1260 Tetrachloro-m-xylene (SURROGATE)	ND ND ND ND ND 680 47	33 33 33 33 33 33 33 0	ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg % Recovery	EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 QC LIMITS 40-130		
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LABORATORY

TESTS 10/27/95

RESULTS

JOB NUMBER: 952701

DATE SAMPLED.....: 09/06/95

TIME SAMPLED....: 00:00

:LIENT I.D....: DAC-Torrance/6495203

WORK DESCRIPTION...: Composite of #34-1-#37

CUSTOMER:

Environmental Science & Engineerng

ATTN: David Ferreira

LABORATORY I.D...: 952701-0052

DATE RECEIVED....: 09/08/95

TIME RECEIVED ....: 07:30

REMARKS..... Soil; Brass Sleeve

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE	TECHN
Sonication Extraction for PCBs	COMPLETED		N/A	EPA 3550	09/11/95	TH
Polychlorinated Biphenyls		*1		EPA 8080	09/11/95	CIS
Aroclor-1016 Aroclor-1221 Aroclor-1232 Aroclor-1242 Aroclor-1248 Aroclor-1254 Aroclor-1260 Tetrachloro-m-xylene (SURROGATE)	ND ND ND ND ND ND 400 45	33 33 33 33 33 33 33 0	ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg % Recovery	EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 QC LIMITS 40-130		
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LABORATORY

TESTS RESULTS

10/27/95

JOB NUMBER: 952701

CUSTOMER: Environmental Science & Engineering

ATTN: David Ferreira

:LIENT I.D.....: DAC-Torrance/6495203

ATE SAMPLED..... 09/06/95 TIME SAMPLED..... 00:00

WORK DESCRIPTION...: Composite of 26-1 Thru 29-12

LABORATORY I.D...: 952701-0053 DATE RECEIVED....: 09/08/95

TIME RECEIVED....: 07:30 REMARKS..... Soil; Brass Sleeve

TEST DESCRIPTION	FINAL RESULT	LIMITS/*DILUTION	UNITS OF MEASURE	TEST METHOD	DATE TECH
onication Extraction for PCBs	COMPLETED		N/A	EPA 3550	09/14/95 TH
Polychlorinated Biphenyls		*1		EPA 8080	09/11/95 CIS
Aroclor-1016 Aroclor-1221 Aroclor-1232 Aroclor-1242 Aroclor-1248 Aroclor-1254 Aroclor-1260 Tetrachloro-m-xylene (SURROGATE)	ND ND ND ND ND ND ND ND	33 33 33 33 33 33 33 0	ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg % Recovery	EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 EPA 8080 QC LIMITS 40-130	
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REPORT QUALITY ASSURANCE

10/27/95

ATTN: David Ferreira CUSTOMER: Environmental Science & Engineerng JOB NUMBER: 952701

'CBs by EPA 8080

DATE ANALYZED: 09/11/95 TIME ANALYZED: 00:00 METHOD: EPA 8080

QC NUMBER:945887

			BLA	N K S			,
EST DESCRIPTION	ANALY	SUB-TYPE	ANALYSIS I.D.	DILUTION FACTOR	ANALYZED VALUE	DETECTION LIMIT	UNITS OF MEASURE
Aroclor-1016 Aroclor-1221 Iroclor-1232 Iroclor-1242 Aroclor-1254 Iroclor-1260 Tetrachloro-m-xylene (SURROGATE)	METHOD METHOD METHOD METHOD METHOD METHOD METHOD		091195 091195 091195 091195 091195 091195 091195 091195	1 1 1 1 1 1 1 1 1	<33 <33 <33 <33 <33 <33 <33 <45	33 33 33 33 33 33 33 0	ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg ug/kg % Recovery

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QUALITY ASSURANCE REPORT

10/27/95

CUSTOMER: Environmental Science & Engineerng JOB NUMBER: 952701

ATTN: David Ferreira

PUBS by EPA 8080

DATE ANALYZED: 09/11/95 TIME ANALYZED: 00:00 METHOD: EPA 8080

QC NUMBER:945887

EST	ANALYSIS	ANALYSIS	DILUTION	ANALYZED	ORIGINAL	SPIKE	PERCENT	DETECTION	UNITS OF
ESCRIPTION	SUB-TYPE	I. D.	FACTOR	VALUE	VALUE	ADDED	RECOVERY		MEASURE
octor-1254	MATRIX MATRIX DUP	952701-20 952701-20	1 1	360 370	0	330 330	109 112	33 33	ug/kg ug/kg
etrachloro-m-xylene (SURROGAT	MATRIX MATRIX DUP	952701-20	1 1	43 47	0	100 100	43 47	0	% Recovery % Recovery
		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,							
			:						

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